Stryker Endoscopy
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X8000 Light Source

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Service Guide

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Warnings and Cautions

Please read this manual and follow its instructions carefully. The words warning, caution, and note carry special meanings and should be carefully reviewed:

Warning	**Warnings indicate risks to the safety of the patient or user. Failure to follow warnings may result in injury to the patient or user.**
Caution	**Cautions indicate risks to the equipment. Failure to follow cautions may result in product damage.**
Note	Notes provide special information to clarify instructions or present additional useful information.

An exclamation mark within a triangle is intended to alert the user of special warnings or important operating and maintenance instructions in the manual.

A lightning bolt within a triangle is intended to warn of the presence of hazardous voltage. Refer all service to authorized personnel.

The incorrect use of any of the required tools and/or techniques may risk damage to the equipment or injury to the person carrying out the procedure, subsequent operators, or patient. Perform the repair ONLY if you have been specifically trained in the use of all pertinent equipment and techniques. Stryker Endoscopy cannot continue to guarantee compliance to UL, CSA, TUV, or other labeled safety standards if service is performed by anyone other than Stryker Endoscopy personnel.

To help avoid potential serious injury to the user and the patient and/or damage to this device:

1. Read this manual thoroughly, especially the warnings, and be familiar with its contents prior to using this equipment.
2. Never sterilize any part of the X8000 console.
3. Disconnect the X8000 from the electrical outlet when inspecting the fuses.
4. Ensure that readjustments, modifications, and/or repairs are carried out exclusively by Stryker Endoscopy or other authorized personnel.
5. Ensure that the electrical installation of the relevant operating room complies with the applicable IEC, CEC, and NEC requirements.

Federal law (United States of America) restricts this device to use by, or on order of, a physician.

IMPORTANT SAFETY NOTICE

Before operating or performing any maintenance or repairs on the X8000 Light Source, read the user guide and service guide thoroughly and carefully. When using any light source, such as the X8000, fire and/or severe injury may result to the patient, user or inanimate objects, if the instructions in this manual are not followed.

All light sources, including the X8000, can generate significant amounts of heat at the scope tip, the scope light post, the light cable tip, and/or near the light cable adapter. Higher levels of brightness from the light source result in higher levels of heat.

To avoid the risk of burns and/or fire:

- Always adjust the brightness level of the camera and the monitor before adjusting the brightness level of the light source.
- Adjust the brightness level of the light source to the minimum brightness necessary to adequately illuminate the surgical site.
- Adjust the internal shutter of the camera higher in order to run the light source at a lower intensity.
- Avoid touching the scope tip or the light cable tip to the patient, and never place them on top of the patient, as doing so may result in burns to the patient or user.
- Never place the scope tip, the scope light post, the light cable adapter, or the light cable tip on the surgical drapes or other flammable material, as doing so may result in fire.
- Always place the light source in Standby mode whenever the scope is removed from the light cable or the device is unattended. The scope tip, scope light post, light cable adapter, and light cable tip will take several minutes to cool off after being placed in Standby mode, and therefore may still result in fire or burns to the patient, user, or inanimate objects.

Introduction

This manual is intended to be used as a service guide for Stryker repair technicians in the installation, maintenance, and repair of the Stryker X8000 Light Source. It is meant to be used in conjunction with the X8000 Light Source User Manual (1000-400-885) and does not replace existing documentation.

Service Options

Factory Service

Due to the complexity of the X8000 Light Source, Stryker recommends that any malfunctioning system be returned to Stryker Endoscopy for repair or replacement, where specialized equipment and technicians are available to perform repairs while maintaining full product quality and safety. If service is needed either during or after the warranty period:

1. Contact Stryker Endoscopy at 1-800-624-4422, or contact your local Stryker Endoscopy sales representative.
2. Package all the components carefully in the original shipping container, if possible.
3. Ship the X8000 Light Source, prepaid and insured, to:

   Stryker Endoscopy Customer Service
   Attention: Repair Department
   5900 Optical Court
   San Jose, California 95138

You may request a loaner unit during the repair period.

On-Site Service

Stryker Endoscopy accepts responsibility for the effects on safety, reliability, and performance of the equipment only if readjustments, modifications, and repairs have been carried out exclusively by a person specifically authorized by Stryker Endoscopy to do so.

On-site repair should be carried out only by qualified technicians with the proper test equipment listed in this manual, so that the safety of operators and patients is not compromised.

In no event shall Stryker Endoscopy be liable for incidental or consequential damages in connection with or arising from the performance or use of its products after unauthorized modification or repair.

Required Skills, Tools, and Components

The repair procedures described in this manual require a basic set of skills, tools, and replacement components.

Skills

Stryker recommends diagnostic and repair procedures be performed by authorized, qualified technicians with training or experience in the following:

- Basic electronics techniques
- Multimeter operation
- Oscilloscope operation
- Vectorscope operation
- BioTek Safety Analyzer operation

Tools

Most of the procedures described in this manual can be performed using a basic tool kit that includes the items listed below.

Basic tools	Advanced tools
• Phillips screwdriver • Flathead screwdriver • 8″ adjustable wrench • Needlenose pliers • Color video monitor • Glass fuse puller	• Multimeter • Oscilloscope (20 Mhz or higher) • NTSC/Pal Vectorscope • BioTek Model 601 PRO Safety Analyzer or equivalent current leakage tester

Components

Replacement parts are identified in the “Device Diagrams” section of this manual. Certain components are for in-house use only and will not be available to any non-Stryker entity.

Before any parts are purchased, an Indemnification Letter must be signed and submitted to Stryker Endoscopy, available from Customer Service at 1-800-624-4422.

Stryker reserves the right to incorporate improvements to the X8000 without notice and will inform customers of any significant upgrades. All updated parts will be fully interchangeable with older versions and will offer at least the same level of quality and performance.

For up-to-date information on upgrades to the product or to this manual, contact your Stryker representative.

Reference Documents

None of the in-house Manufacturing Assembly Procedures (MAPs), Quality Inspection Procedures (QIPs), specialty tools, jigs, or fixtures listed in this manual are available for purchase.

Device Description

The Stryker X8000 Light Source is a light-generating unit designed to illuminate surgical sites during endoscopic applications. The X8000 uses a 300-watt xenon bulb to generate light, which it delivers to the surgical site via a fiberoptic light cable.

The X8000 is compatible with all Stryker light cables, and, with the proper light cable and adapters, can connect to any flexible or rigid endoscope.

The X8000 is equipped with Electronic Scope Sensing Technology (ESST), a special safety feature that helps prevent accidental burns caused by a light cable that is not connected to the scope. When operated with an ESST light cable, the X8000 senses when the scope and the light cable are separated and places the light source in Standby mode. In Standby mode, the X8000 will reduce light output to a minimum, preventing the light cable from generating excessive heat.

Technical Specifications

Electrical

Primary: 100 – 120 VAC, 50/60 Hz, 450 W
220 – 240VAC, 50/60 Hz, 450 W
Fuses (2): 5.0A, 250V

Dimensions

Height: 4.75″ (12.1 cm)
Width: 12.5″ (31.8 cm)
Depth: 16.8″ (42.7 cm)
Weight: 16.0 lbs (7.3 kg)

Fiberoptic Cable Range

2 – 6.5 mm diameter

Bulb

Type: 300 Watt Xenon (Elliptical)
Life: Approximately 500 hours

Operating Conditions

10 – 40°C
30 – 75% Relative Humidity

Transportation and Storage

-20 – 50°C
10 – 75% Relative Humidity
700 – 1060 hPa

Classifications and Approvals

Complies with medical safety standards:

- IEC 60601-1:2005
- CAN/CSA C22.2 No.601.1-M90
- UL 60601-1: 2003

Complies with medical EMC standard:

- IEC 60601-1-2:2001

Class 1 Equipment

Type CF applied parts

Water Ingress Protection, IPX0 — Ordinary Equipment

Continuous Operation

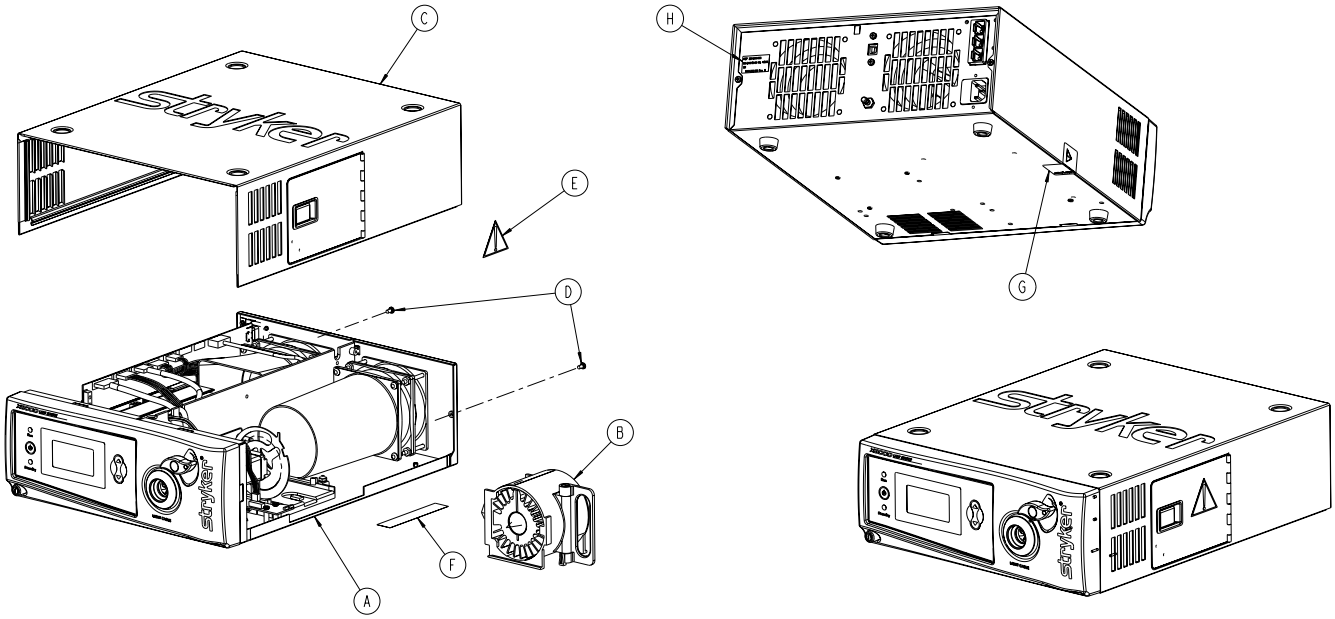
Patent Protection

U.S. #5,850,496; 6,110,107; and 6,689,050. Other patents pending.

Device Diagrams

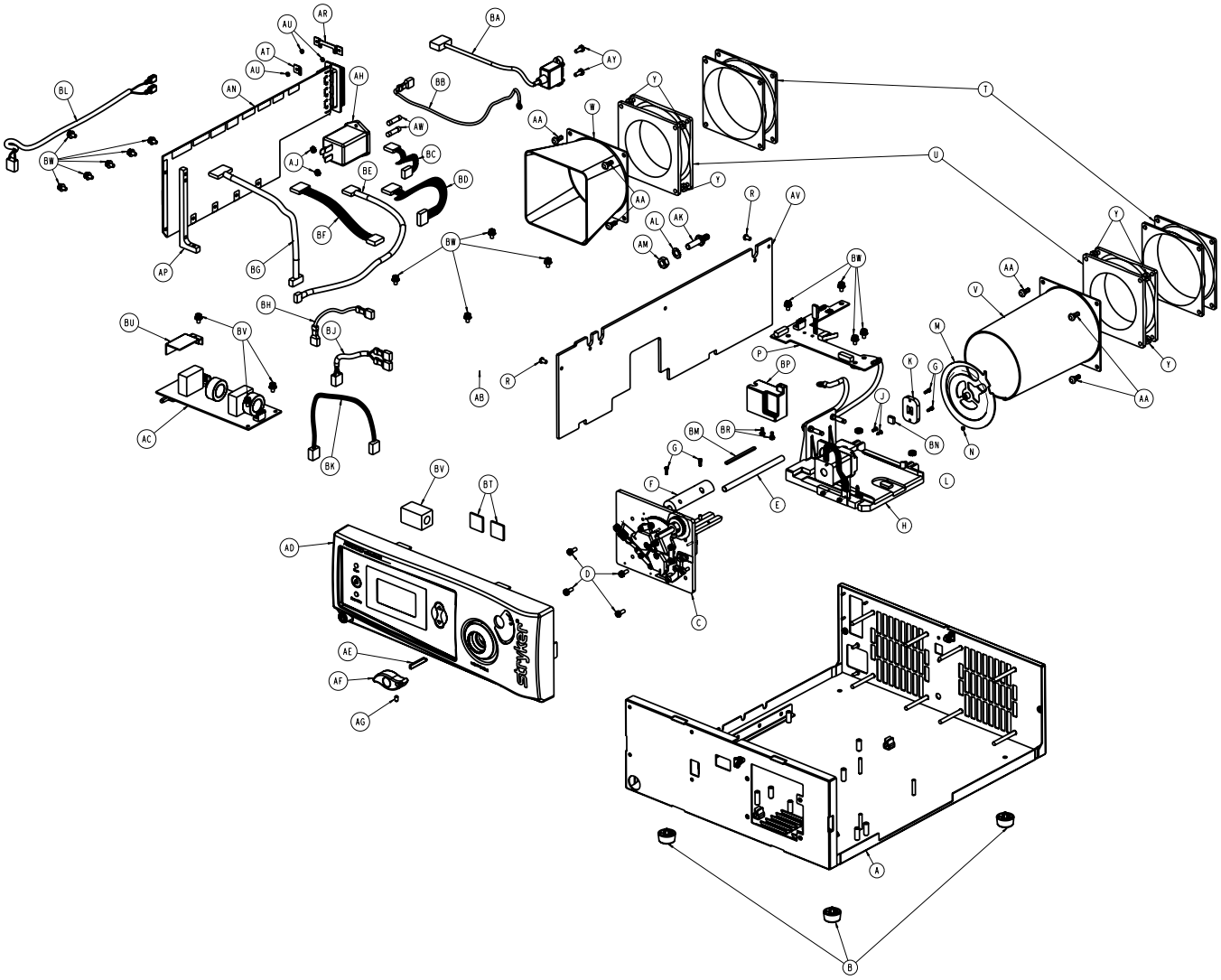
The individual components of the X8000, which are referred to throughout this manual, are identified in the following diagrams.

Top Chassis Assembly



ITEM	PART NUMBER	DESCRIPTION	QTY
A	105-206-330	ASSY, X8000 BOTTOM TRAY	1
B	105-206-331	ASSY, X8000 ELLIPTICAL BULB MODULE	1
C	105-206-332	ASSY, X8000 COVER	1
D	105-193-198	SCREW, 6-32 X 0.25 PH EXT. SEMS	2
E	1000-205-888	LABEL, WARNING	1
F	1000-206-949	LABEL, X8000 BULB REPLACEMENT	1
G	1000-201-096	LABEL, WARNING VIOLATION	1
H	1000-206-981	LABEL, MODEL/SERIAL NO. X8000 BULB	1

Bottom Chassis Assembly



ITEM	PART NUMBER	DESCRIPTION	QTY
A	105-206-343	CHASSIS, X8000	1
B	105-160-710	FOOT, SOFT	4
C	105-206-580	ASSY, JAW/INTEGRATING ROD MOUNT, X8000	1
D	105-192-441	SCREW, 6-32 X 0.375 PH PH EXT. SEMS	4
E	105-200-314	ROD, INTEGRATING	1
F	105-200-277	HOLDER, INTEGRATING ROD, UPPER	1
G	105-200-344	SCREW, 2-56 X .250, SOCKET HD	4
H	105-206-342	ASSY, MOTOR, X8000	1
J	105-187-645	SCREW, #2-56,1/4,FH,PH	2
K	105-199-632	HOLDER, HOT MIRROR	1
L	105-150-489	NUT,# 6-32,SS	4
M	105-206-577	SHUTTER, X8000	1
N	103-539-001	SCREW ,SET #6-32 X 1/8 SOCKET SET FLPT HD	1
P	105-206-279	ASSY, BULB MOUNT BOARD, X8000	1

R	105-193-198	SCREW, 6-32 X .25 PH PH EXT SEMS	2
T	105-206-498	FAN DUCT, X8000	2
U	105-206-507	ASSY, 3-WIRE FAN	2
V	105-206-325	BULB DUCT, X8000	1
W	105-206-326	BALLAST DUCT, X8000	1
Y	105-150-491	8-32 NUT, SS	7
AA	105-206-816	RIVET, NYLON SNAP	8
AB	105-206-413	BALLAST, CARSAN, X8000	1
AC	105-206-121	ASSY, AC INLET BOARD	1
AD	105-206-334	ASSY, FRONT PANEL, X8000	1
AE	105-199-641	KEY, JAW HANDLE, X7000	1
AF	105-203-554	HANDLE, JAW, X7000	1
AG	105-207-446	SCREW, SET, 6-32 X 1/4", NYLON PATCH, SOC HEX	1
AH	105-206-575	AC INLET FILTER	1
AJ	105-150-484	NUT,KEP #4-40 SS B	2
AK	105-150-419	PROBE, GROUND	1
AL	105-150-421	WASHER, 1/4 EXTERNAL TOOTH, BRASS	1
AM	105-197-754	NUT,M6 BRASS	1
AN	105-206-873	ASSY, CONTROL BOARD, X8000	1
AP	105-201-223	SUPPORT, FAN	1
AR	105-206-584	U-BRACKET	1
AT	105-206-585	S-BRACKET	1
AU	105-207-455	HEX SPACER, 2-56 X 13/16 IN LENGTH	3
AV	105-206-328	SEPARATOR, X8000	1
AW	105-202-435	FUSE, 5A, 250V, 5MM X 20MM, SLO-BLO	2
AY	105-150-348	SCREW, 4-40 X 5/16 PHIL PAN HD	2
BA	105-206-597	USB B CABLE	1
BB	105-206-591	ASSY, CABLE, GROUND POST, X8000	1
BC	105-206-509	ASSY, CABLE, CONTROL BOARD/BALLAST LAMP STATUS	1
BD	105-206-563	ASSY, CABLE, CONTROL BOARD/BALLAST LIT-ENABLE-INTENSITY	1
BE	105-206-565	ASSY, CABLE, CONTROL BOARD/DISPLAY BOARD	1
BF	105-206-567	ASSY, CABLE, CONTROL BOARD/BALLAST	1
BG	105-206-566	ASSY, CABLE, CONTROL BOARD/BULB MOUNT BOARD	1
BH	105-206-587	ASSY, CABLE, GROUND POST, AC INLET BOARD/BALLAST	1
BJ	105-206-571	ASSY, CABLE, AC INLET BOARD/BALLAST	1
BK	105-206-572	ASSY, CABLE, AC INLET BOARD/BULB MOUNT BOARD	1
BL	105-206-570	ASSY, CABLE, AC FILTER/AC INLET BOARD	1
BM	105-206-595	SILICONE RUBBER, 2" x 1/8"	1
BN	105-206-576	HOT MIRROR, X8000	1
BP	105-206-596	GUARD, THERMAL SWITCH	1
BR	105-204-448	SCREW, 4-40 X 1/4 NYLON PHIL PH	2
BT	105-150-874	MOUNT, TIE CABLE	1
BU	105-207-014	AC INLET BOARD SHIELD	1
BV	105-192-211	FERRITE BEAD, CLAMP-ON	1
BW	105-207-102	SCREW, 6-32X5/16 PHIL PAN FLAT/SPLIT SEMS	17
BY	105-150-873	CABLE TIE	6

Basic Maintenance

Cleaning the X8000

Caution **Unplug the X8000 before cleaning the unit.**

1. As needed, clean the external surfaces of the X8000 using a cloth or sponge dampened with a mild detergent or disinfectant.
2. Clean and maintain the light cable according to the manufacturer's instructions.

Caution **Do not use any abrasive cleaners. Do not allow any liquid to drip into the unit.**

Caution **Do not sterilize or immerse the X8000.**

Caring for the Bulb Module

The X8000 uses a Xenon bulb, which has a guaranteed life of 500 hours when used properly. Always follow these guidelines to ensure maximum bulb life:

1. If the bulb is touched, clean the bulb face with alcohol and a cotton swab. Dirt or oil on the bulb face will cause the bulb to heat unevenly and fail.
2. Do not power on and off the bulb in rapid succession. Allow the bulb to run for at least five minutes once it has been powered on. Failure to do so can cause the bulb to rapidly darken and fail.

Caution **The X8000 has been designed to start the bulb under most conditions, even when it is hot. However, if the bulb does not start within 10 seconds after the X8000 has powered on, turn the unit off and wait at least five minutes for the bulb to cool before restarting. Further attempts to start the bulb can damage the bulb and possibly the internal circuitry.**

Replacing the Bulb Module

Replace the bulb module when the LCD indicates 500 hours or when the bulb no longer sufficiently illuminates the surgical site. If possible, replace the bulb module between surgical procedures.

Warning **During operation, the bulb and the housing around the bulb may be hot. Wait at least three minutes for the bulb to cool before handling it.**

To replace the bulb module,

1. Power down the X8000 and wait at least three minutes for the bulb to cool.
2. Open the bulb door.
3. Rotate the bulb module handle to the right, grasp it, and withdraw the bulb.

Warning **Do not reach inside the bulb door for any reason other than replacing the bulb module. Touching parts other than the bulb module may cause burns or product damage.**

Warning **Do not touch any part of the bulb module except for the handle. The module may be very hot and cause burns.**

4. Insert the new bulb module (Stryker part number 220-201-000) along the guide rails until it is fully seated on the mating connectors.
5. Rotate the handle to the left to secure the bulb module within the light source.
6. Close and latch the bulb door.
7. Power on the unit.
8. Power on the bulb (if not already on) and verify that the LCD displays the bulb hours as "0."

Note Using a non-Stryker replacement bulb module will result in no light output.

Caution **Do not operate the X8000 with a burned-out bulb or with no bulb installed.**

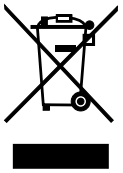
Replacing the Fuses

1. Unplug the light source from the AC outlet and remove the power cord from the rear of the unit.
2. Unlatch the fuse holder and remove the fuse(s).
3. Replace the fuse(s) with fuse(s) of the same value and rating.

Warning **To help avoid the risk of fire, use only 5.0A 250V fuses.**

4. Reinstall the fuse holder.

Disposing of the X8000



This product is considered electronic equipment. It must not be disposed of as unsorted municipal waste and must be collected separately. Please contact the manufacturer or other authorized disposal company to decommission your equipment.

Troubleshooting

Problem	Possible Solution
No light output	• Ensure the AC power cord is properly connected to a hospital-grade power outlet and the inlet on the rear console panel. • Ensure the power switch on the front panel is powered on. (It will illuminate when powered on.) • Ensure all fuses are operating. • Ensure the bulb is properly seated in the bulb housing. The bulb handle should be turned all the way to the left within the light source. • Ensure the bulb is in operating condition. Replace the bulb if necessary. • Ensure the light cable is correctly engaged with the cable port. As a safety feature, the X8000 will provide no light output unless a fiberoptic light cable is properly seated in the cable port. • Ensure the bulb access door is completely shut. • Check for error codes E-1, E-2, E-3, E-4 or E-5. See the Error Code Definitions section of this manual for details. • Check that vents are not obstructed. • If the safety shutoff has been activated, please return the X8000 for service. Please see the Component Replacement section of this manual for additional information.
Too much or too little light output	• Ensure the light cable is correctly engaged with the cable port. • Ensure the bulb has adequate bulb life remaining. The bulb has a warranty of 500 hours. • Ensure the X8000 is in Run mode. (The Run LED should be illuminated.) If necessary, press the Mode button to switch from Standby to Run. If the unit remains in Standby: 1. Ensure the light cable is correctly engaged with the cable port. 2. If an ESST cable is connected to the X8000, ensure the cable is attached to the scope using an ESST scope adapter. • Use the up/down buttons to adjust the brightness. • Ensure the fiberoptic cable is transmitting light properly. Hold the light-source end of the cable to an overhead room light and look into the scope end of the light cable. If the pattern contains any black spots, the light cable may be worn out and may require replacement. • Ensure the light cable is of an adequate size for the application. The cable diameter may be too small to provide adequate light transmission for the medical video camera in the endoscopic application.
Excessive glare in the video	• Ensure the electronic shutter on the camera is operating properly to control the video signal brightness. If further light reduction is required, decrease the light source brightness with the down button.

Error Code Definitions

The X8000 displays error codes when one of the following conditions occurs. Follow the recommended action to correct the error.

Code	Definition	Recommended Action
E-1	All conditions are met for the bulb to illuminate, yet it remains off.	Consult the Diagnosis section of this manual.
E-2	All conditions are not met for the bulb to illuminate, yet it remains on.	Consult the Diagnosis section of this manual.
E-3	The bulb has higher than expected current or voltage applied to it.	Consult the Diagnosis section of this manual.
E-4	The bulb is kept off because the ballast fan is not working properly.	Consult the Diagnosis section of this manual.
E-5	The bulb is kept off because the bulb fan is not working properly.	Consult the Diagnosis section of this manual.
Blinking 500	The bulb has exceeded its recommended lifetime of 500 hours.	Install a new Stryker bulb.
Replace Bulb	The bulb has reached 1000 hours and has exceeded its recommended lifetime of 500 hours.	Install a new Stryker bulb.

Diagnosis

To diagnose system errors, follow the strategies provided below. For steps that involve test points on the control board, refer to the control board diagram at the end of the Diagnosis section.

Diagnosis strategies are grouped by symptom:

A. Bulb does not turn on
B. Bulb does not turn off
C. Bulb ignites immediately upon system startup
D. LCD display is blue or completely dark
E. Fan does not run
F. Light source does not switch from STANDBY to RUN mode
G. Brightness cannot be adjusted
H. E-1 error appears on the LCD display
I. E-2 error appears on the LCD display
J. E-3 error appears on the LCD display
K. E-4 error appears on the LCD display
L. E-5 error appears on the LCD display
M. Bulb hours value does not display
N. Shutter makes noise or does not move properly.

A. Bulb does not turn on

1. Check the voltages on the control board test points TP22 and TP23.
   - If the test points read 12V and 0V respectively, then the ballast is faulty. Replace the ballast.
   - If the voltages are in the vicinity of 5.5V and 7V respectively, proceed to step 2.
2. Visually check if the bulb door is properly closed with the cover or a stand-alone magnet. If necessary, close the door.
3. Visually check if the light cable is properly inserted into the jaw. If necessary, reinsert the cable.
4. Visually check if the bulb has the one-wire memory chip. If it does, ensure the chip makes contact with the bulb mount board connector. If necessary, adjust contact between the chip and the connector.
5. Using a multimeter, electronically check the following test points on the control board. Each test point should read 3.3 volts.
   - PD1—reads 3.3 volts if the one wire chip is detected by the control board. If PD1 reads 0 volts (and PD2 reads 3.3 volts), try a different bulb. Push the bulb firmly towards the plastic separator panel to ensure contact.
   - PD2—reads 3.3 volts if the door reed switches are closed. If PD2 reads 0 volts,
     - Check if the reed switches on the bulb mount boards are soldered properly. If necessary, repair the soldering.
     - Check for shorts using the magnet on the reed switch. Repair/replace as necessary.
     - Check if the cable wire colors are correctly oriented. Adjust as necessary.
   - PD3—reads 3.3 volts if the fans are functioning properly
   - PD4—reads 3.3 volts if a regular light cable is inserted. If PD4 reads 0 volts, remove the front panel and check if the beam sensor is properly positioned and connected to the display board. Adjust as necessary.
   - PD5—reads 3.3 volts if an ESST light cable is inserted. If PD5 reads 0 volts, remove the front panel and check if the beam sensor is properly positioned and connected to the display board. Adjust as necessary.
6. If none of these help, contact Technical Support at +1.800.624.4422.

B. Bulb does not turn off

If the bulb turns on immediately after AC power is applied to the light source, proceed to diagnosis strategy C, "Bulb ignites immediately upon system startup."

If the bulb ignites after the regular startup sequence but then will not turn off, perform the following steps until the source of the problem is identified.

1. Remove the light cable from the jaw.
2. Open the bulb door or remove the magnet from the reed switches.
3. Using a multimeter, check the following test points on the control board:
   - PD2—If PD2 reads 3.3 volts, the reed switches are faulty. Replace the reed switches.
   - PD4 and PD5—If either PD4 or PD5 reads 3.3 volts, the light cable sensor (beam sensor) is faulty. Replace the light cable sensor.
4. If PD4 or PD5 reads 0 volts, measure the voltage difference between TP22 and TP23.
   - If the voltage difference is around -1.3 volts, replace the ballast.
   - If the voltage difference is around 12 volts, proceed to step 5.
5. Measure the voltage level for TP32.
   - If TP32 reads 0 volts, replace the control board. (See the Repair/Replacement Procedures section of this manual.)
   - If TP32 reads 3.3 volts, proceed to step 6.

6. Measure the voltage for TP34.
    - If TP34 reads 0 or 1.6 volts, replace the control board. (See the Repair/Replacement section of this manual.)
    - If TP34 reads otherwise, contact Technical Support at +1.800.624.4422.

C. Bulb ignites immediately upon system startup

1. Check if the jumpers on the ballast (JP300) are properly installed. When the ballast is viewed from the bulb side, the jumpers should read **0 I I 0 I 0 0.** Adjust as necessary.
2. Check the voltage difference between TP22 and TP23 on the control board:
    - Turn off system power
    - Connect the positive multimeter probe to TP22 and the negative probe to TP23
    - Turn on system power
    - If the voltage difference is around 12V, proceed to step 3
    - If the voltage difference is around -1.3 volts, replace the ballast (See the Repair/Replacement section of this manual.).
3. Check the voltage of TP32. If it does not read 3.3 volts, replace the control board (See the Repair/Replacement section of this manual.).

D. LCD display is blue or completely dark

Power on the light source:

- If you hear the fans running, or if the power button is lighted, perform steps 1 – 3.
- If you don't hear the fans running, and the power button is not lighted, perform step 4.

1. Check if the cable between the control board and front display board is connected properly. Adjust as necessary.
2. Insert the bulb, close the bulb door, and measure the voltages of PD1 and PD2 on the control board.
    - If they do not read 3.3 volts, replace the control board. (See the Repair/Replacement section of this manual.)
    - If they do read 3.3 volts, proceed to step 3.
3. Measure the voltage across the C47 and C48 capacitors (directly beneath the display board cable on the control board side).
    - If they read 3.3 volts and 12.3 volts respectively, replace the display board (See the Repair/Replacement section of this manual.).
    - If not, replace the control board (See the Repair/Replacement section of this manual.).
4. Make sure that the 6-pin power cable from the ballast to the control board is connected.
    - If the power button lights up, perform steps 1 – 3.
    - If the power button still does not light up, replace the control board (See the Repair/Replacement section of this manual.).

E. Fan does not run

1. If one or both fans are not working, an E-4 (ballast) or E-5 (bulb) error should display on the LCD screen. Confirm this.
2. If both fans do not work, measure the voltage on the 10.2V test point on the control board (underneath lamp status connector).
    - If it does not read around 10.2 volts, replace the control board (See the Repair/Replacement section of this manual.).
3. If only one fan works, switch the fan connectors between the working and non-working fans.
    - If non-working fan still fails to run, then it is faulty. Replace it. (See the Repair/Replacement section of this manual.)
    - If the non-working fan begins to run, but the working fan stops running, then the control board is faulty. Replace it. (See the Repair/Replacement section of this manual.).

F. Light source does not switch from STANDBY to RUN mode

1. Check if the bulb is lit. If it is lit, go to step 2. If it is not lit, then go to diagnosis strategy A.
2. Press the brightness up and brightness down buttons on the membrane. Check if the mini brightness meter in the top right corner of the display increases or not.
    - If the meter does not change, remove the front panel and check if the front panel membrane connector is fully connected to the display board. Adjust as necessary.
    - If the meter does change and the membrane is properly connected, cycle the light source power.
        - As the LCD powers up, check the software version numbers. They should read at least SW REV P 1. 2 and SW REV P.1.2 consecutively. (The revision numbers may be higher if newer software versions are installed.)
        - If the version numbers are not at least 1.2, contact Technical Support at +1.800.624.4422 for software updates.
        - If the version numbers are adequate, contact Technical Support.

G. Brightness cannot be adjusted

1. Switch the light source between STANDBY and RUN modes by pressing on the membrane switch. (Make sure to use a non-ESST cable, or an ESST cable that has the ESST adaptor at the tip.)
   - If the light source does not switch between modes, replace the control board (See the Repair/Replacement section of this manual.)
   - If the light source switches between modes, but brightness cannot be increased or decreased, proceed to step 2.
2. Remove the jaw handle and the plastic front panel. Ensure that the front panel membrane is properly connected to the front LCD display board. Adjust as necessary.
3. If the membrane is properly connected, but brightness still cannot be adjusted, replace the membrane.
4. If the new membrane does not work, check for proper connection between the control board and the display board. Adjust as necessary.
5. If the membrane works after checking the connections, replace the front LCD display board (See the Repair/Replacement section of this manual.)

H. E-1 error appears on the LCD display

1. Make sure that the light cable is inserted, the bulb door is closed with a bulb inside, and the lamp is not lit.
2. Check the voltages on TP22 and TP23.
   - If the voltage difference between TP22 and TP23 is not 12V, replace the control board.
   - If the voltage difference between these two test points is 12V, ensure the J3 cable is connected properly to the ballast and that the individual wires are not crossed.
     - Ensure that L3 and L4 ferrites, located underneath the J3 connector, are soldered properly to the control board.
     - If these ferrites are missing, broken, or not soldered properly, repair or replace the control board.
3. If none of the above steps resolves the problem, replace the ballast.

I. E-2 error appears on the LCD display

1. Make sure that the bulb is lit and the light is on.
2. Repeat diagnosis strategies B and C, respectively.

J. E-3 error appears on the LCD display

1. Probe TP13 with a multimeter.
   - If it reads 3.3 volts, and E-3 still appears on the display, replace the control board.
   - If the voltage on TP13 is low, replace the ballast.

K. E-4 error appears on the LCD display

1. Verify that the ballast fan is not running.
2. Ensure the ballast fan is connected to the control board.
3. If the fan seems to be working, visually compare the speed of the ballast fan to the bulb fan.
   - If the ballast fan seems to be running slower, replace the fan and verify that the E-4 error disappears.
   - If the E-4 error does not disappear with the new fan, replace the control board.

L. E-5 error appears on the LCD display

1. Check to verify that the bulb fan is not running.
2. Ensure the ballast fan is connected to the control board.
3. If the fan seems to be working, visually compare the speed of the bulb fan to the ballast fan.
   - If the ballast fan seems to be running slower, replace the fan and verify that the E-5 error disappears.
   - If the E-5 error does not disappear with the new fan, replace the control board.

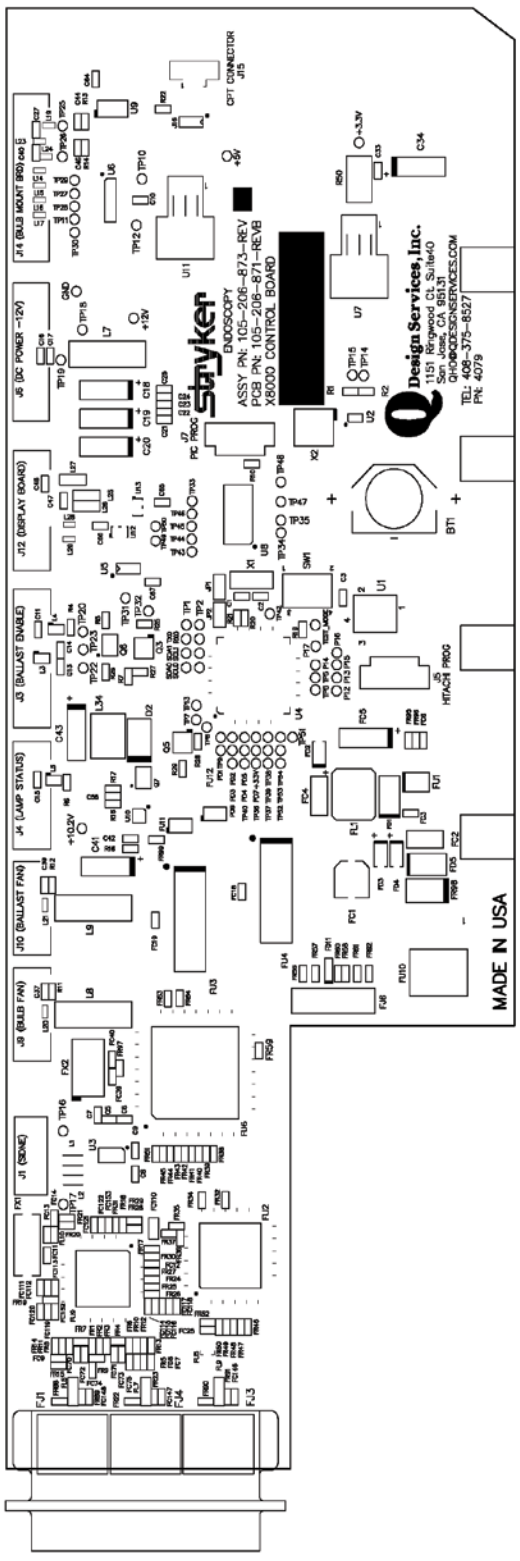
M. Bulb Hours value does not display

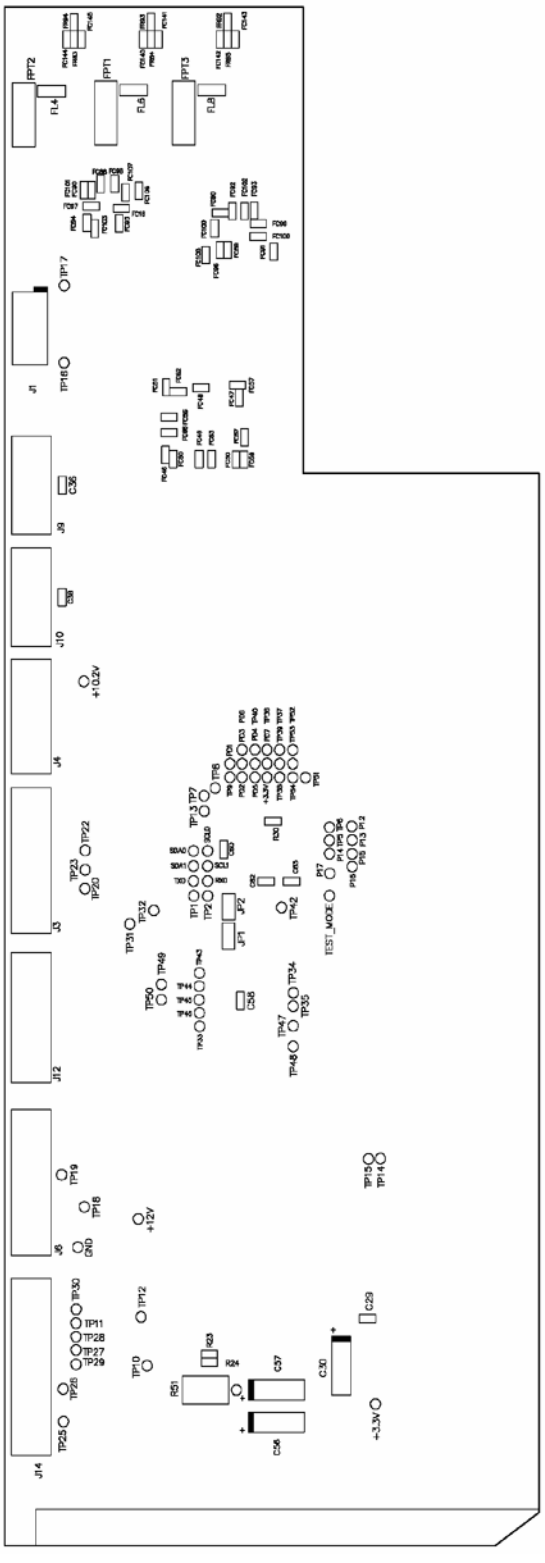
1. Connect a regular light cable to the light source.
2. Make sure there is a bulb in the light source, close the door, and verify that it is lit.
3. Verify that there is a one-wire memory properly attached.
4. Verify that the one-wire memory is making contact with the connectors on the bulb mount board.
5. If the bulb does not light, perform diagnosis strategy A.
6. If you are unsure about the proper contact, insert a new bulb to see if the hours will display.
7. If the hours still do not display, verify that the cable between the bulb mount board and the control board is properly connected.
8. If the cables are properly connected, but the hours still do not display, replace the control board.

N. Shutter makes noise or does not move properly.

1. Check the pinouts of the motor cable and the bulb mount board/control board cable. Make sure the wire colors match the drawing.
2. Make sure the connectors J1 and J2 on the bulb mount board are not soldered in the wrong direction.
3. Make sure the minimum shutter switch is soldered properly. Make sure the switch lever is properly connected to the switch itself.
4. Make sure the shutter wheel is properly connected to the motor shaft.
5. Make sure the shutter wheel is not rubbing against the hot mirror holder.
6. If the motor is rotating the shutter in the reverse direction when power is applied to the light source, replace the motor.
7. If the motor is hesitantly rotating the shutter back and forward, then replace the motor.
8. If the shutter's mini tab is catching the bottom of the minimum shutter switch, replace the bulb mount board.
9. If none of the steps above solves the problem, contact Technical Support at +1.800.624.4422.

Control Board Diagrams





Repair/Replacement

The X8000 Light Source is a precision instrument that has been engineered and manufactured with great care to ensure the safety of operators and patients. In order to maintain the high level of safety and reliability required in devices of this nature, it is important to fully understand and comply with all required procedures set forth herein.

If some part of a procedure is omitted or adequate equipment is not used, the safety and performance of the devices may be unknowingly compromised. If any of the procedures described in this manual are beyond the scope of the technician's training, consult the "Service Options" section of this manual for information on how to obtain service from Stryker Endoscopy.

As is the case with all AC powered devices, dangerous voltages are present. If adequate safety precautions are not taken, results may include damage to the equipment, personal injury, or death. It is imperative that these procedures are approached only by trained technicians with proper equipment after fully reading and understanding the steps involved.

Caution **ESD Protection is required to perform this assembly. Failure to follow this procedure can cause undetectable damage to electrical components.**

Note For all steps that involve the application of Loctite, apply Loctite to the threaded holes rather than to the threads on the screws unless otherwise specified.

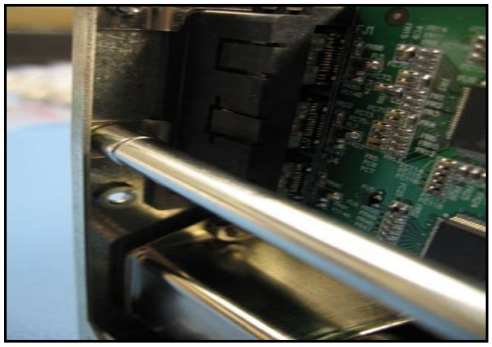
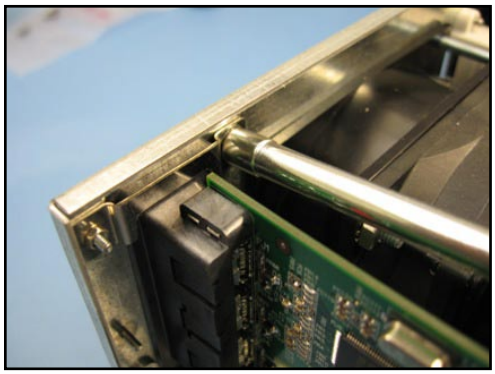
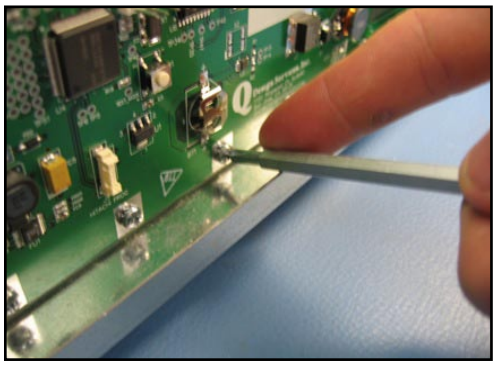
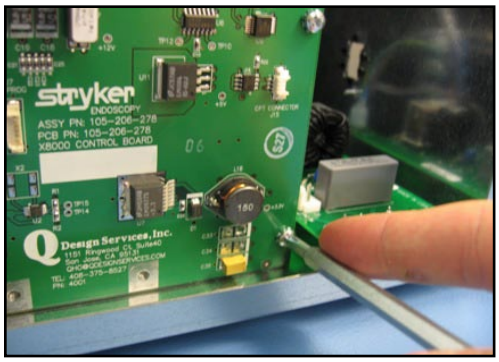
Note When using a power screwdriver, set torque setting to 3 high unless otherwise specified.

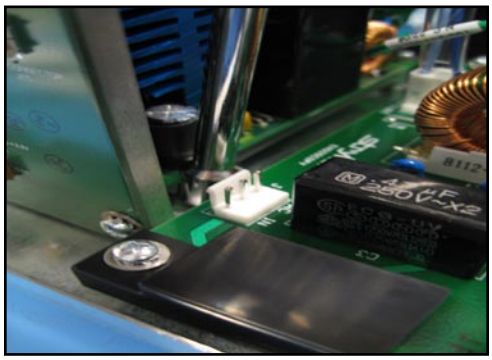
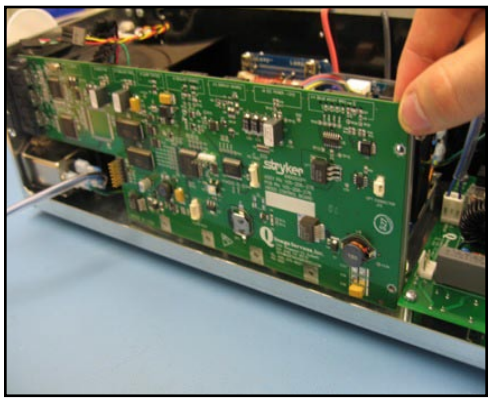
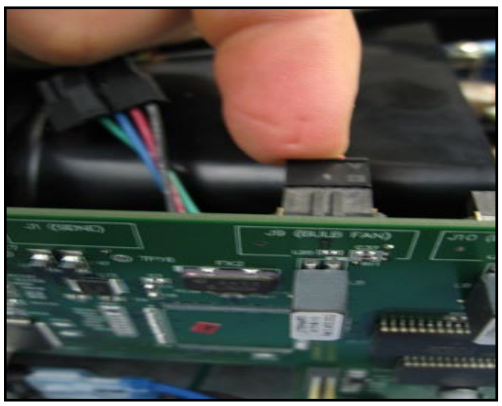
Each of the following tables provides repair/replacement instructions for specific components of the X8000. For each instruction, the required tools, equipment, and replacement part numbers are provided.

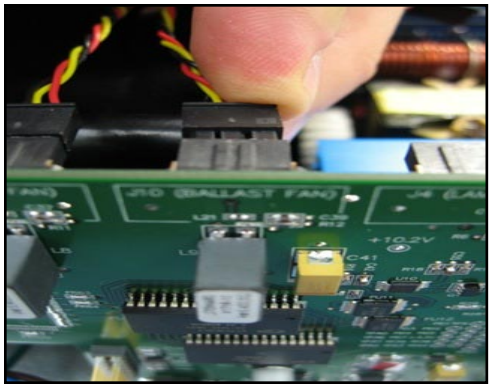
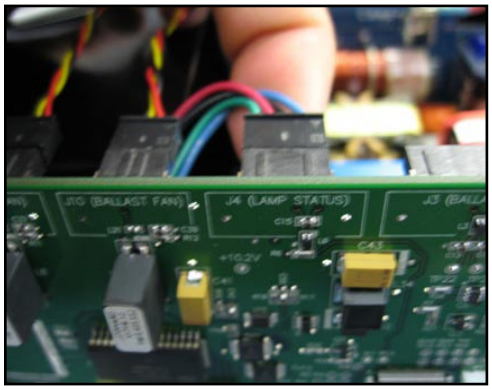
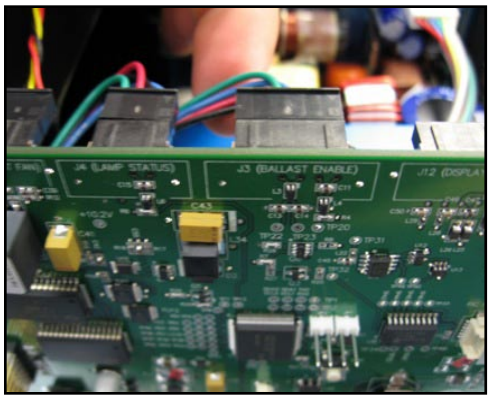
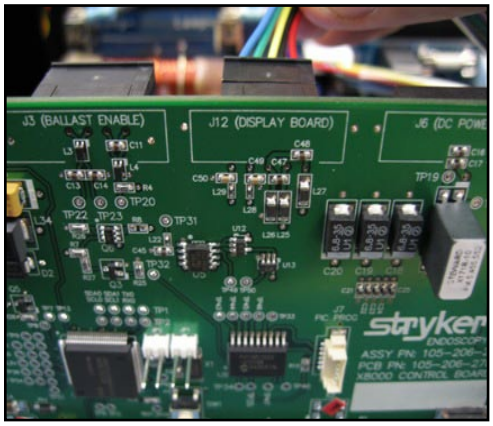
1.0 Chassis Cover

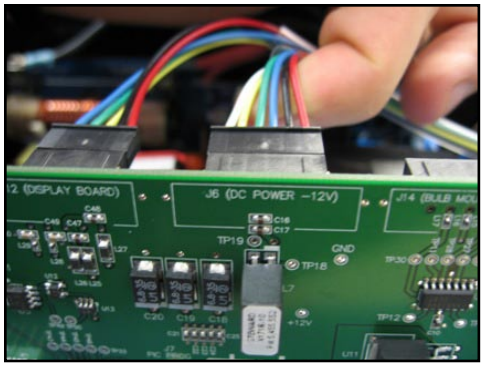
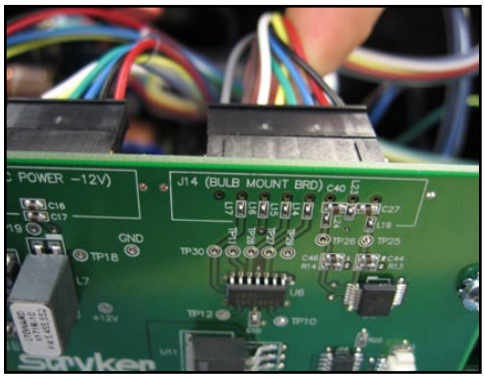
Seq.	Task Description	Figure	Tools Needed	Parts
10	Unscrew Chassis Cover from Chassis. ⚠ Torque setting of 5.		• Power Screwdriver (Phillips)	• 6-32 x 0.25 PH Ext. Sems. (2) (198) • X8000 Cover (407) • X8000 Chassis (343)
20	Remove Chassis Cover from Chassis.			• X8000 Cover (407) • X8000 Chassis (343)

2.0 Control Board

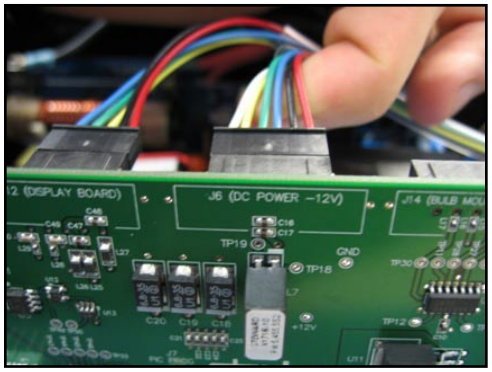
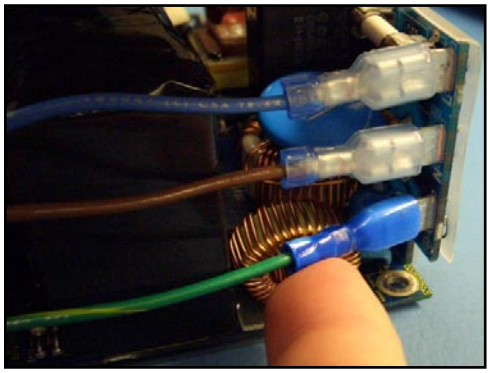
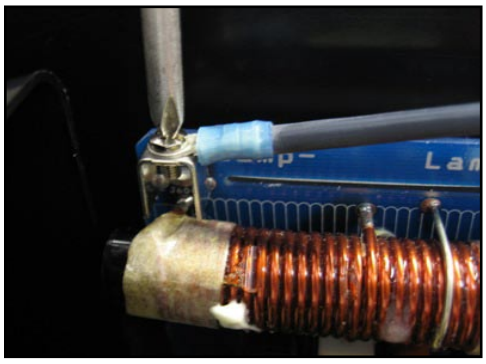
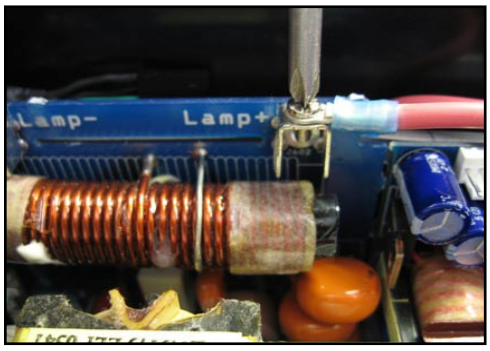
Seq.	Task Description	Figure	Tools Needed	Parts
30	Remove Chassis Cover from Chassis (procedure 1.0).			
40	Remove all Cables connected to the Control Board. Unscrew S-Bracket from Chassis as shown.		• 4mm Nut Driver	• 2-56 Hex Nut (866) • S-Bracket (585) • X8000 Chassis (343)
50	Unscrew U-Bracket from Chassis as shown.		• 4mm Nut Driver	• 2-56 Hex Nut (2) (866) • U-Bracket (584) • X8000 Chassis (343)
60	Unscrew Control Board from lower Control Board mounts as shown. ⚠ Do not bend Control Board!		• Power Screwdriver (Phillips)	• 6-32 x 5/16 PH Screw (4) (102) • X8000 Control Board (873) • X8000 Chassis (343)
70	Unscrew Control Board from Fan Support. Remove Control Board from Unit.		• Power Screwdriver (Phillips)	• 6-32 x 5/16 PH Screw (2) (102) • Fan Support (223) • X8000 Control Board (873)

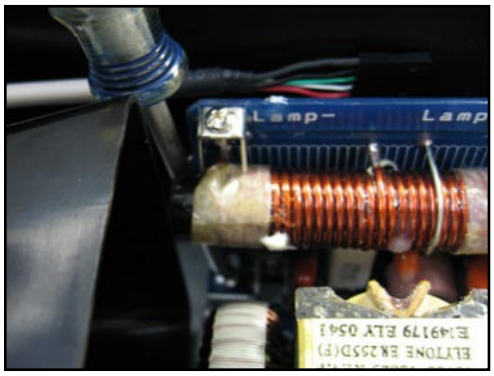
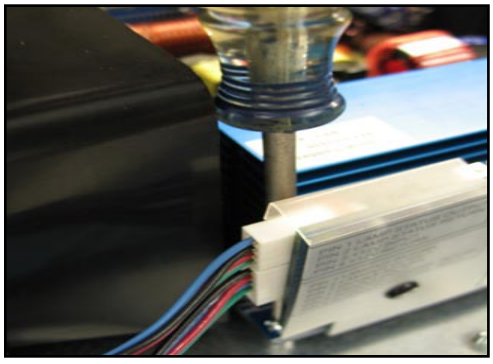
80	Get New Control Board. Remove Control Board from metal-shielded bag and place on ESD-safe Mat.			• X8000 Control Board (873)
90	Loosen the Fan Support from the Chassis. This will allow for easier reassembly.		• 5/16” Nut Driver	• 6-32 SS Nut (489) • Fan Support (223) • X8000 Chassis (343)
100	Place new Control Board into Chassis and align with screw mounts on Chassis flange. ⚠ Be careful not to hit the A/C Inlet Board!			• X8000 Control Board (873) • X8000 Chassis (343)
110	Connect 3-Wire Fan cable from Bulb Fan to Control Board connector J9 (BULB FAN). ⚠ Do not bend Control Board!			• 3-Wire Fan Cable from Bulb Fan (3-Pin 3-Wire) • X8000 Control Board (873)

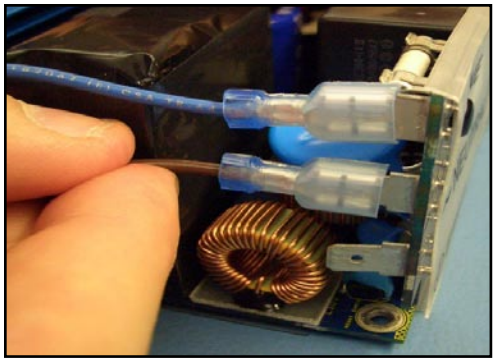
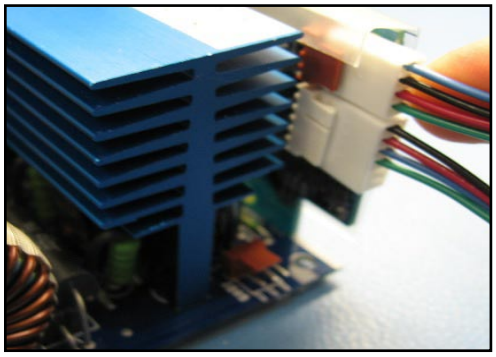
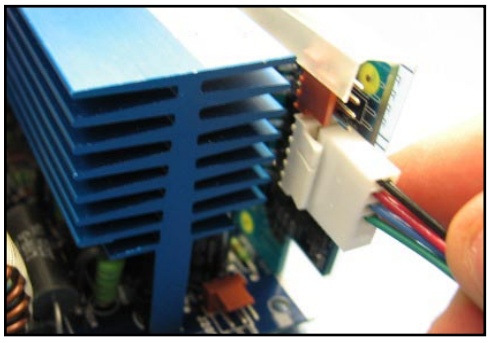
120	Connect 3-Wire Fan from Ballast Fan to Control Board connector J10 (BALLAST FAN). ⚠ Do not bend Control Board!		• 3-Wire Fan Cable from Ballast Fan (3-Pin 3-Wire) • X8000 Control Board (873)
130	Connect 4-Pin 4-Wire Control Board/Ballast Lamp Status Cable to Control Board connector J4 (BALLAST FAN). ⚠ Do not bend Control Board!		• Control Board/Ballast Lamp Status Cable (4-Pin 4-Wire) (509) • X8000 Control Board (873)
140	Connect 6-Pin 4-Wire Control Board/Ballast Lit-Enable-Intensity Cable to Control Board connector J3 (BALLAST ENABLE). ⚠ Do not bend Control Board!		• Control Board/Ballast Lit-Enable-Intensity Cable (6-Pin 4-Wire) (563) • X8000 Control Board (873)
150	Connect 5-Pin 5-Wire Control Board/Display Board Cable from Display Board to Control Board connector J12 (DISPLAY BOARD). ⚠ Do not bend Control Board!		• Control Board/Display Board Cable (5-Pin 5-Wire) (565) • X8000 Control Board (873)

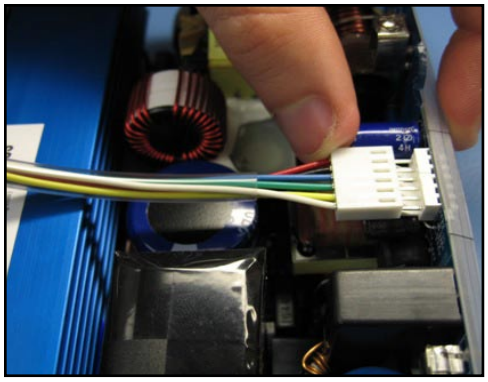
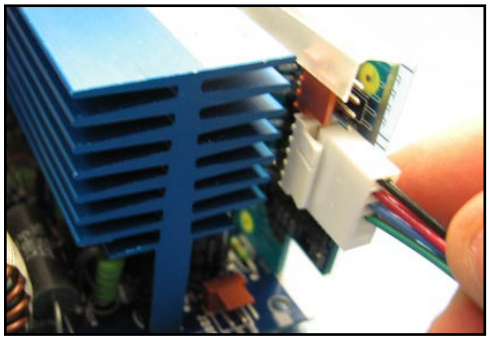
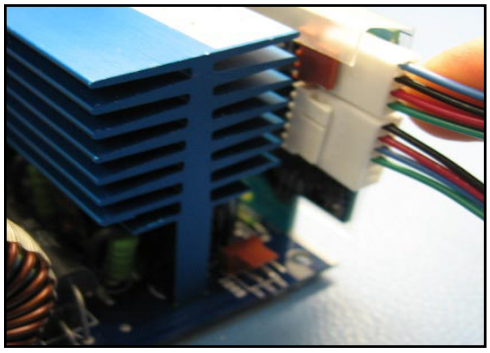
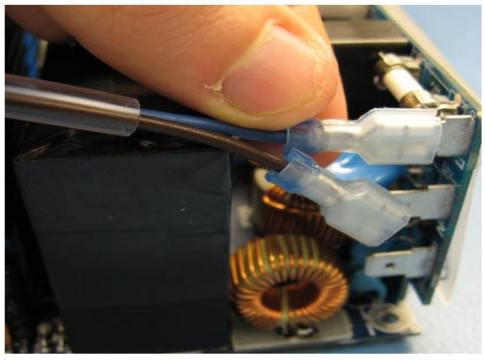
160	Connect 6-Pin 6-Wire Control Board/Ballast Cable from Ballast to Control Board connector J6 (DC POWER – 12V). ⚠ Do not bend Control Board!			• Control Board/Ballast Cable (6-Pin 6-Wire) (567) • X8000 Control Board (873)
170	Connect 8-Pin 8-Wire Control Board/Bulb Mount Board Cable from Bulb Mount Board to Control Board connector J14 (BULB MOUNT BRD). ⚠ Do not bend Control Board!			• Control Board/Bulb Mount Board Cable (8-Pin 8-Wire) (566) • X8000 Control Board (873)
180	Slide Chassis Cover onto Chassis until flush with Chassis and secure			• X8000 Cover (407) • X8000 Chassis (343)
190	Screw Chassis Cover to Chassis. ⚠ Torque setting of 5.		• Power Screwdriver (Phillips)	• 6-32 x 0.25 PH Ext. Sems. (2) (198) • X8000 Cover (407) • X8000 Chassis (343)

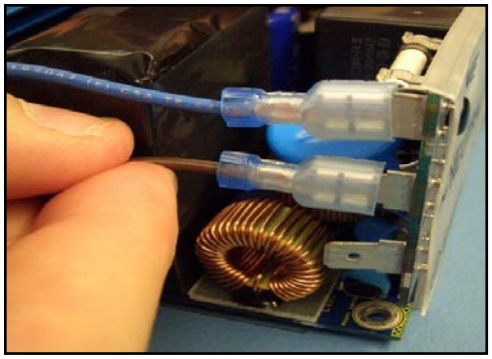
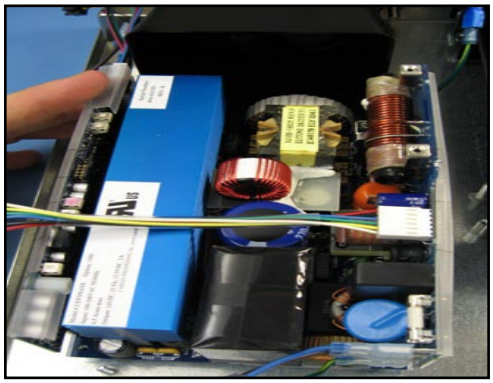
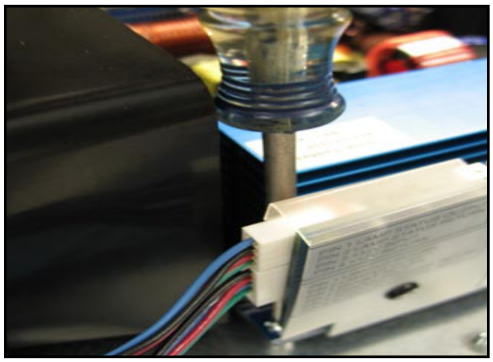
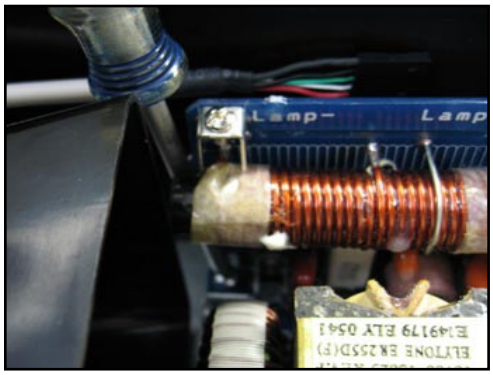
3.0 Ballast

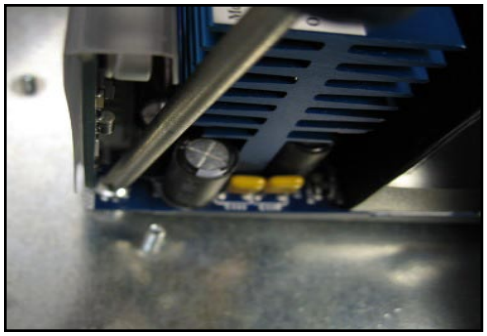
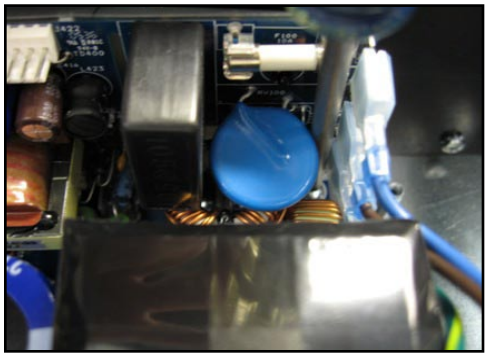
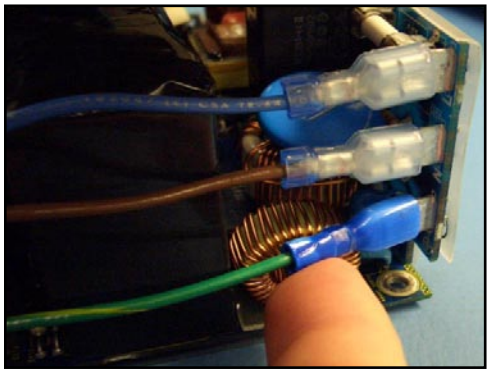
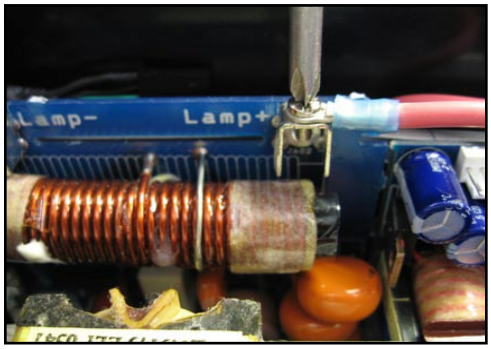
Seq.	Task Description	Figure	Tools Needed	Parts
200	Remove Chassis Cover from Chassis (procedure 1.0).			
210	Disconnect all cables on the Control Board side. ⚠ Do not bend Control Board!			• X8000 Control Board (873)
220	Remove green Ground Post A/C Inlet Board/Ballast Cable from bottom Ballast connector GND J103.		• Needlenose Pliers	• Ground Post AC Inlet Board/Ballast Cable (587) • X8000 Ballast (413)
230	Unscrew black Ballast/ Bulb Cathode Cable from Ballast.		• Power Screwdriver (Phillips)	• Ballast/Bulb Anode Cable Assembly (568) • X8000 Ballast (413)
240	Unscrew red Ballast/Bulb Anode Cable from Ballast.		• Power Screwdriver (Phillips)	• Ballast/Bulb Anode Cable Assembly (569) • X8000 Ballast (413)

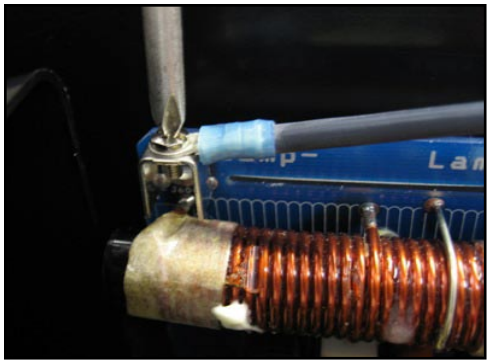
250	Unscrew Ballast from front-left Chassis PEM as shown.		• Power Screwdriver (Phillips)	• 6-32 x 5/16 PH Screw (1) (102) • X8000 Ballast (413) • X8000 Chassis (313)
260	Unscrew Ballast from front-right Chassis PEM as shown.		• Power Screwdriver (Phillips)	• 6-32 x 5/16 PH Screw (1) (102) • X8000 Ballast (413) • X8000 Chassis (313)
270	Unscrew Ballast from rear-left Chassis PEM as shown.		• Power Screwdriver (Phillips)	• 6-32 x 5/16 PH Screw (1) (102) • X8000 Ballast (413) • X8000 Chassis (313)
280	Unscrew Ballast from rear-right Chassis PEM as shown Remove the ballast from the unit.		• Power Screwdriver (Phillips)	• 6-32 x 5/16 PH Screw (1) (102) • X8000 Ballast (413) • X8000 Chassis (343)

290	Remove Brown and Blue lead of AC Inlet Board/ Ballast Cable from original Ballast.		• Needlenose Pliers	• X8000 Ballast (413) • A/C Inlet Board/ Ballast Cable Assembly (571)
300	Remove Control Board/ Ballast Lamp Status Cable from original Ballast.			• X8000 Ballast (413) • Control Board/ Ballast Lamp Status Cable Assembly (4-Pin) (509)
310	Remove Control Board/ Ballast Lit-Enable-Intensity Cable from original Ballast.			• X8000 Ballast (413) • Control Board/Ballast Lit-Enable-Intensity Cable (6-Pin 4-Wire) (563)
320	Get New Ballast. Remove the Ballast from metal-shielded bag and place on ESD safe mat.			• X8000 Ballast (413)

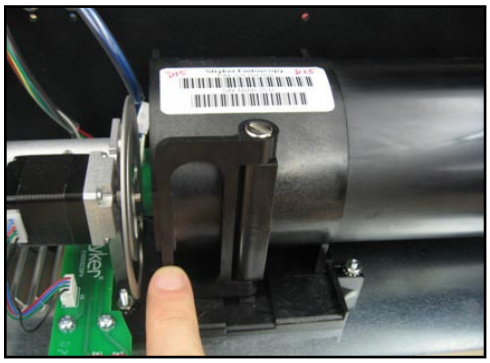
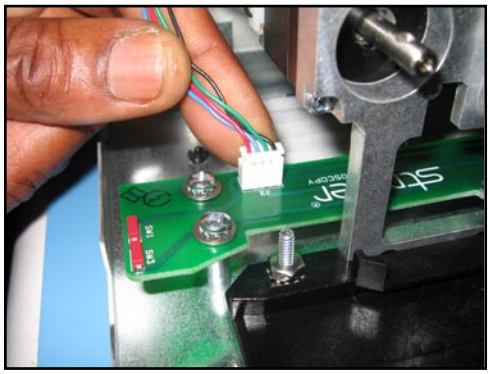
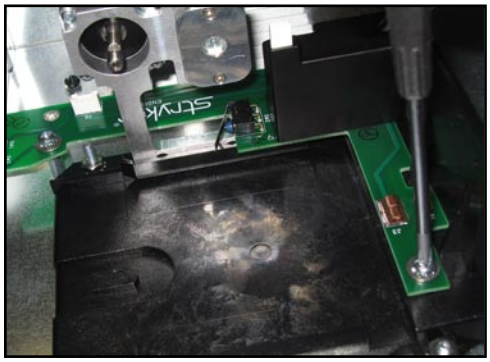
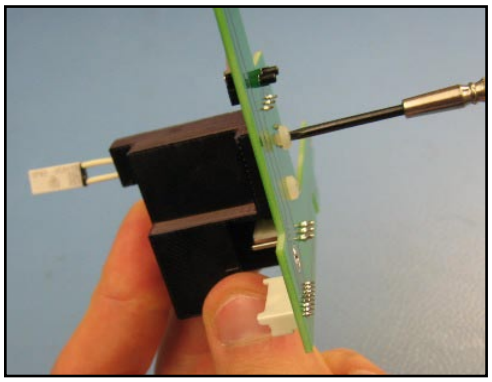
330	Attach Control Board/ Ballast Cable -567 to Ballast Connector J422.			• X8000 Ballast (413) • Control Board/ Ballast Cable Assembly (6-Pin 6-Wire) (567)
340	Attach Control Board/ Ballast Lit-Enable-Intensity Cable -563 to Ballast Connector J500.			• X8000 Ballast (413) • Control Board/Ballast Lit-Enable-Intensity Cable (6-Pin 4-Wire) (563)
350	Attach Control Board/ Ballast Lamp Status Cable -509 to Ballast Connector J504.			• X8000 Ballast (413) • Control Board/ Ballast Lamp Status Cable Assembly (4-Pin) (509)
360	Attach Blue lead of AC Inlet Board/Ballast Cable -571 to top Ballast connector HOT J101. ⚠ Flat end of connector should face in towards Ballast.		• Needlenose Pliers	• X8000 Ballast (413) • A/C Inlet Board/ Ballast Cable Assembly (571)

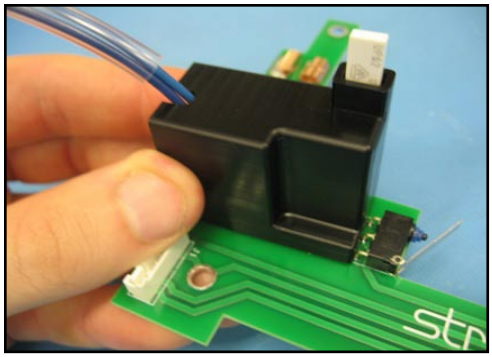
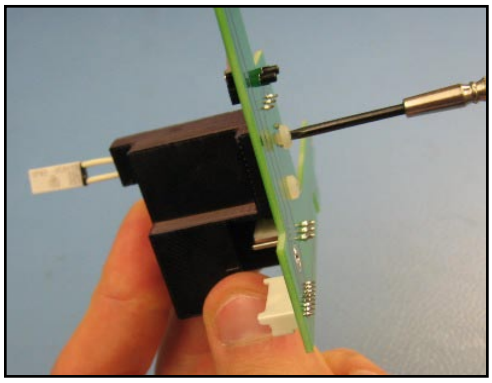
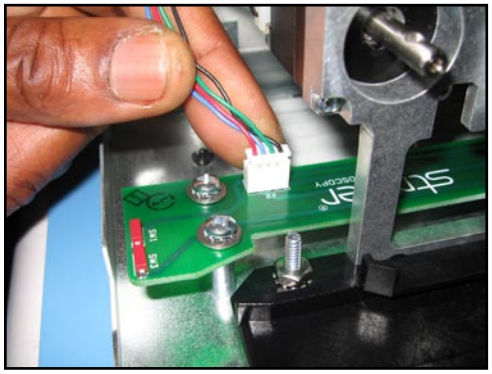
370	Attach Brown lead of AC Inlet Board/Ballast Cable -571 to middle Ballast connector NEUT J102 on Ballast. ⚠ Flat end of connector should face in towards Ballast.		• Needlenose Pliers	• X8000 Ballast (413) • A/C Inlet Board/ Ballast Cable Assembly (571)
380	Place and align Ballast onto Chassis PEM's with Heat Sink towards outside of Chassis.			• X8000 Ballast (413) • X8000 Chassis (343)
390	Screw Ballast to rear-right Chassis PEM as shown.		• Power Screwdriver (Phillips)	• 6-32 x 5/16 PH Screw (1) (102) • X8000 Ballast (413) • X8000 Chassis (343)
400	Screw Ballast to rear-left Chassis PEM as shown.		• Power Screwdriver (Phillips)	• 6-32 x 5/16 PH Screw (1) (102) • X8000 Ballast (413) • X8000 Chassis (313)

410	Screw Ballast to front-right Chassis PEM as shown.		• Power Screwdriver (Phillips)	• 6-32 x 5/16 PH Screw (1) (102) • X8000 Ballast (413) • X8000 Chassis (313)
420	Screw Ballast to front-left Chassis PEM as shown.		• Power Screwdriver (Phillips)	• 6-32 x 5/16 PH Screw (1) (102) • X8000 Ballast (413) • X8000 Chassis (313)
430	Attach green Ground Post A/C Inlet Board/Ballast Cable to bottom Ballast connector GND J103. ⚠ Flat end of connector should face in towards Ballast.		• Needlenose Pliers	• Ground Post AC Inlet Board/Ballast Cable (587) • X8000 Ballast (413)
440	Screw red Ballast/Bulb Anode Cable from forward Banana Plug to Ballast connector J602 LAMP + ⚠ Screw Cable flat side down. ⚠ Torque setting of 3!		• Power Screwdriver (Phillips)	• Ballast/Bulb Anode Cable Assembly (569) • X8000 Ballast (413)

450	Screw black Ballast/Bulb Cathode Cable from rear Banana Plug to Ballast connector J604 LAMP – ⚠ Screw Cable flat side down.Torque setting of 3!		• Power Screwdriver (Phillips)	• Ballast/Bulb Anode Cable Assembly (568) • X8000 Ballast (413)
460	Reconnect all the cables to the Control Board (procedure 2.0, seq 120 - 170).			
470	Slide Chassis Cover onto Chassis until flush with Chassis and secure.			• X8000 Cover (407) • X8000 Chassis (343)
480	Screw Chassis Cover to Chassis. ⚠ Torque setting of 5.		• Power Screwdriver (Phillips)	• 6-32 x 0.25 PH Ext. Sems. (2) (198) • X8000 Cover (407) • X8000 Chassis (343)

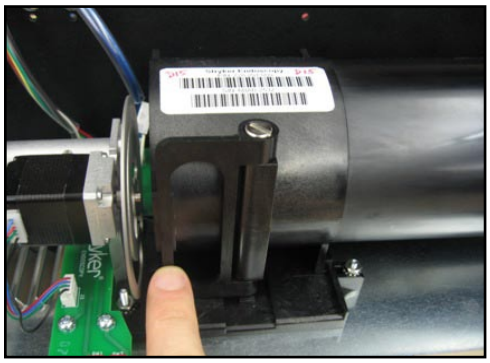
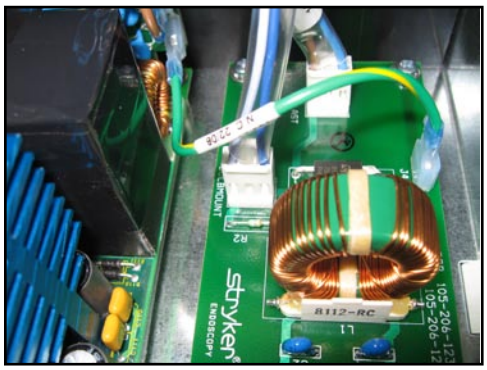
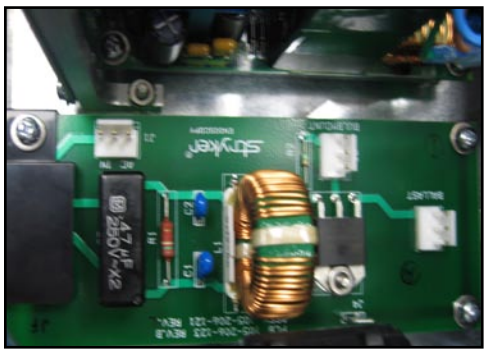
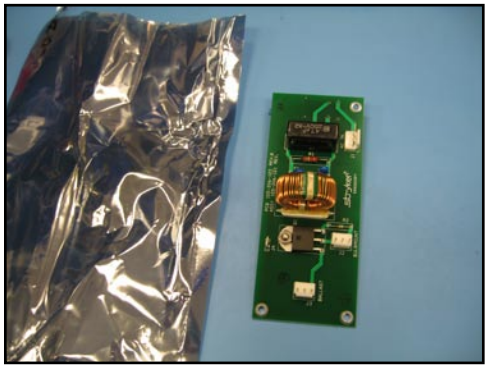
4.0 Bulb Mount Board

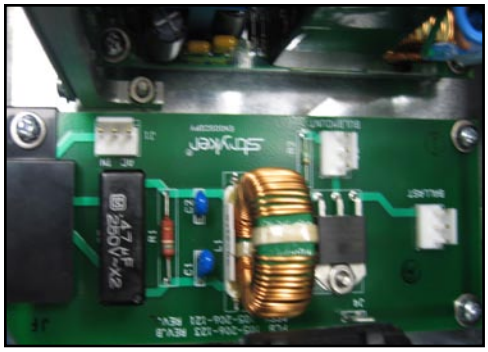
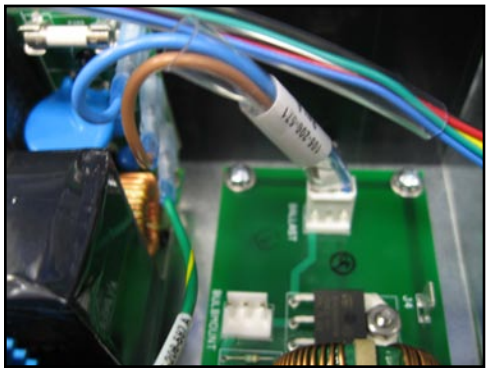
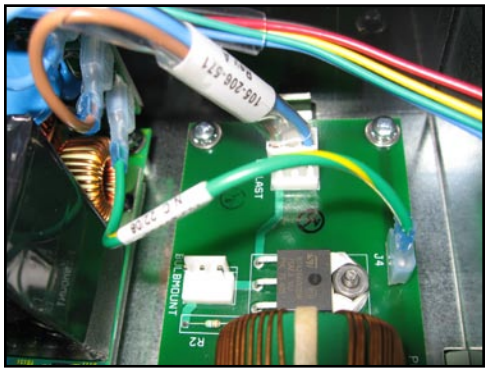
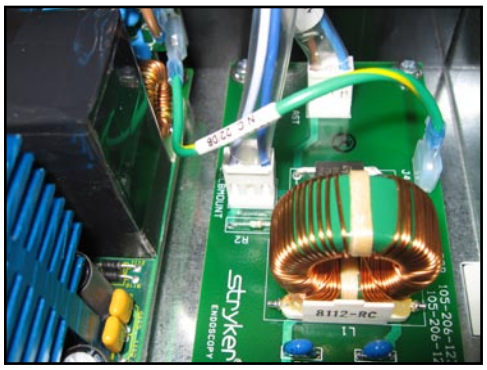
Seq.	Task Description	Figure	Tools Needed	Parts
490	Remove Chassis Cover from Chassis (procedure 1.0). Remove the Bulb Assembly. Unplug A/C Inlet Board/Bulb Mount Board Cable from A/C Inlet Board.			
500	Unplug Stepper Motor connector from Bulb Mount Board connector J2 as shown. Also unplug A/C Inlet Board/Bulb Mount Board Cable from Bulb Mount Board.			• X8000 Stepper Motor (341) • X8000 Horizontal Bulb Mount Board Assembly (279) • A/C Inlet Board/Bulb Mount Board Cable (572
510	Unscrew Bulb Mount Board Assembly from Chassis PEM's. Remove old Bulb Mount Board from unit.		• Power Screwdriver (Phillips)	• 6-32 x 5/16 PH Screw (4) (102) • X8000 Horizontal Bulb Mount Board Assembly (279) • X8000 Rail Plate (329)
520	Remove Thermal Switch Guard from Bulb Mount Board. ⚠ Use a manual screwdriver!		• Screwdriver (Phillips)	• 4-40 x ¼ Nylon Phil. PH Screws (2) (448) • Thermal Switch Guard (596)

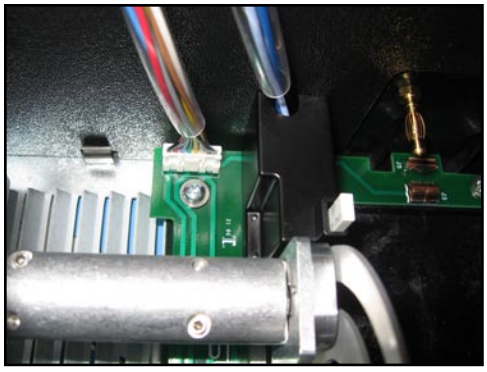
530	Get New Bulb Mount Board. Place Thermal Switch Guide over Thermal Switch and A/C Inlet Board/Bulb Mount Board Cable as shown. ⚠ Pass Thermal Switch through opening in Thermal Switch Guard as shown!			• Thermal Switch Guard (596) • Bulb Mount Board (279)
540	Screw Thermal Switch Guard onto Bulb Mount Board. ⚠ Use a manual screwdriver!		• Screwdriver (Phillips)	• 4-40 x ¼ Nylon Phil. PH Screws (2) (448) • Thermal Switch Guard (596)
550	Get new Bulb Mount Board. Screw Bulb Mount Board Assembly to Chassis PEM's above Rail Plate until secure.		• Power Screwdriver (Phillips)	• 6-32 x 5/16 PH Screw (4) (102) • X8000 Horizontal Bulb Mount Board Assembly (279) • X8000 Rail Plate (329)
560	Plug Stepper Motor connector into Bulb Mount Board connector J2 as shown. Also, plug in A/C Inlet Board/Bulb Mount Board Cable -572 into Bulb Mount Board and A/C Inlet Board.			• X8000 Stepper Motor (341) • A/C Inlet Board/Bulb Mount Board Cable (572) • X8000 Horizontal Bulb Mount Board Assembly (279)

570	Slide Chassis Cover onto Chassis until flush with Chassis and secure.			• X8000 Cover (407) • X8000 Chassis (343)
580	Screw Chassis Cover to Chassis. Insert Bulb back in unit. ⚠ Torque setting of 5.		• Power Screwdriver (Phillips)	• 6-32 x 0.25 PH Ext. Sems. (2) (198) • X8000 Cover (407) • X8000 Chassis (343)

5.0 AC Inlet Board

Seq.	Task Description	Figure	Tools Needed	Parts
590	Remove Chassis Cover from Chassis (procedure 1.0). Remove the Bulb Assembly.			
600	Disconnect all cables from A/C Inlet Board.			• A/C Inlet Board (121)
610	Unscrew A/C Inlet Board from Chassis PEM's. Remove AC Inlet board and AC Inlet Shield from unit.		• Power Screwdriver (Phillips)	• 6-32 x 5/16 PH Screw (3) (102) • A/C Inlet Board (121) • X8000 Chassis (343) • AC Inlet Shield (014)
620	Get new A/C Inlet Board. Remove A/C Inlet Board from metal-shielded bag and place on ESD-safe mat.			• A/C Inlet Board (121)

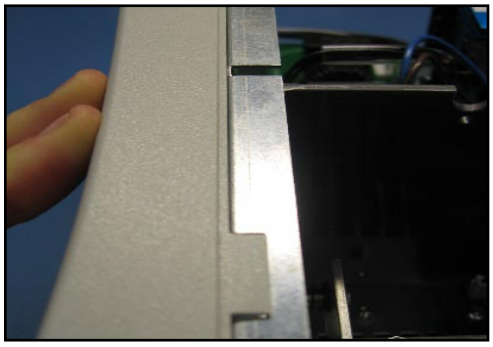
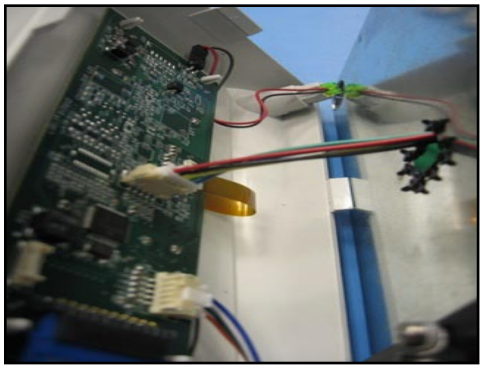
630	Screw A/C Inlet Board to Chassis PEM's with connector GND J4 to front of Chassis. Attach AC Inlet Shield to single screw on left side of board.		• Power Screwdriver (Phillips)	• 6-32 x 5/16 PH Screw (3) (102) • A/C Inlet Board (121) • X8000 Chassis (343) • AC Inlet Shield (014)
640	Connect 3-Pin 2-Wire A/C Inlet Board/Ballast Cable from Ballast to A/C Inlet Board connector J3 BALLAST.			• A/C Inlet Board/Ballast Cable (3-Pin 2 –Wire) (571) • A/C Inlet Board (121)
650	Connect green A/C Inlet Board/Ballast Ground Post Cable from Ballast to A/C Inlet Board connector J4 GND.			• A/C Inlet Board/Ballast Ground Post Cable (1-Wire) (571) • A/C Inlet Board (121)
660	Connect 3-Pin 2-Wire A/C Inlet Board/Bulb Mount Board Cable to A/C Inlet Board connector J2 B.MOUNT.			• A/C Inlet Board/Bulb Mount Board Cable (3-Pin 2-Wire) (572) • A/C Inlet Board (121)

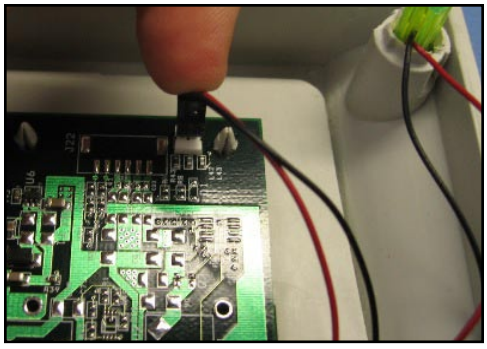
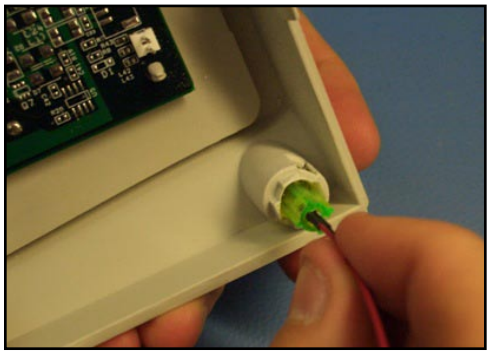
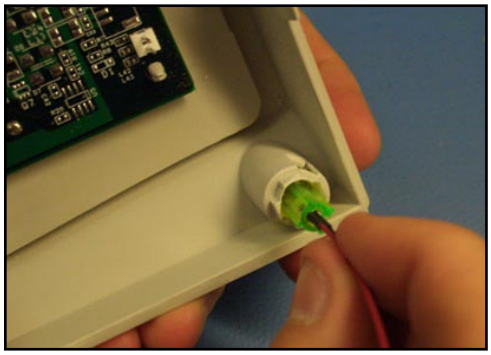
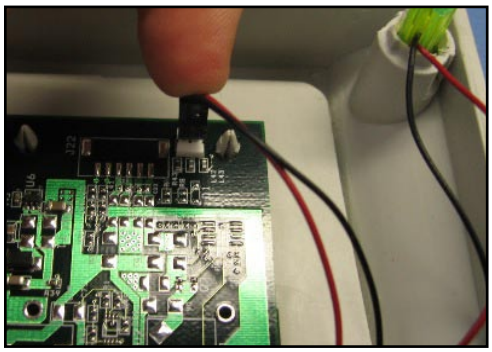
670	Connect 8-Pin 8-Wire Control Board/Bulb Mount Board Cable to Bulb Mount Board connector J1.			• Control Board/Bulb Mount Board Cable (8-Pin 8-Wire) (566) • Bulb Mount Board (279)
680	Slide Chassis Cover onto Chassis until flush with Chassis and secure.			• X8000 Cover (407) • X8000 Chassis (343)
690	Screw Chassis Cover to Chassis. Insert Bulb back in unit. ⚠ Torque setting of 5.		• Power Screwdriver (Phillips)	• 6-32 x 0.25 PH Ext. Sems. (2) (198) • X8000 Cover (407) • X8000 Chassis (343)

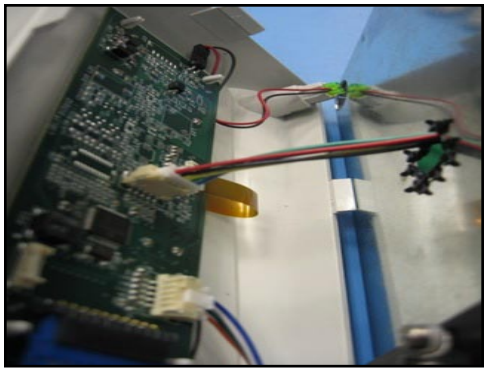
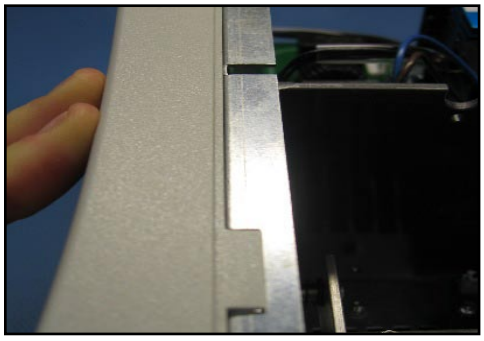
6.0 Jaw Handle

Seq.	Task Description	Figure	Tools Needed	Parts
700	Remove Jaw Handle from Jaw Handle Key and Pinion Shaft as shown. ⚠ Make sure the Jaw Handle Key remains in the Pinion Shaft groove		• 1/16” Hex Wrench	• #6 x ¼ FLPT SS BLK Set Screw (002) • Jaw Handle (554) • Jaw Handle Key (641) • X8000 Pinion Shaft (298)
710	Place small amount of Loctite 222 onto threaded shaft of new Jaw Handle, then place Jaw Handle onto Jaw Handle Key and Pinion Shaft as shown and screw into place until secure. ⚠ Make sure that Loctite does not get on the plastic of Jaw Handle or damage can occur.		• 1/16” Hex Wrench • Loctite 222	• #6 x ¼ FLPT SS BLK Set Screw (002) • Jaw Handle (554) • Jaw Handle Key (641) • X8000 Pinion Shaft (298)

7.0 LED power switch

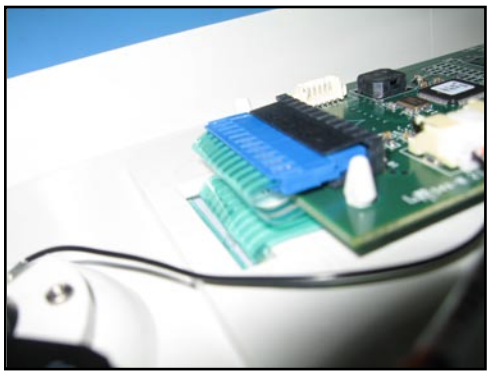
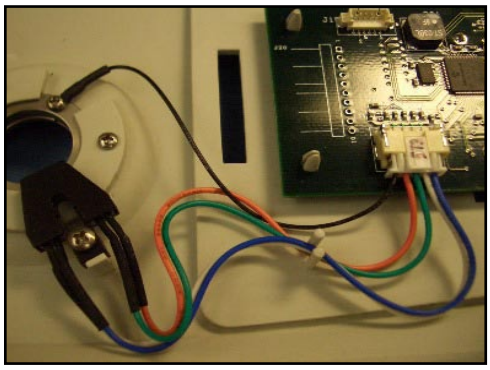
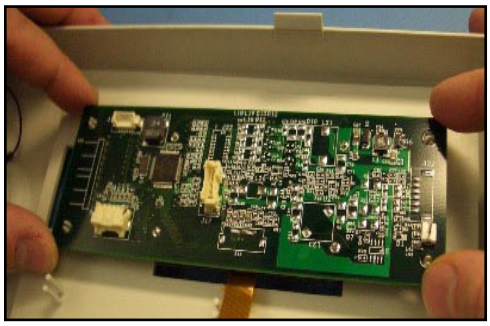
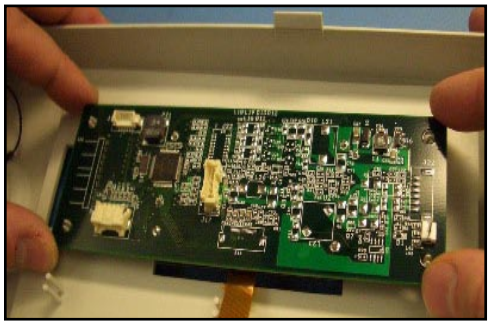
Seq.	Task Description	Figure	Tools Needed	Parts
720	Remove Chassis Cover from Chassis (procedure 1.0).			
730	Remove Jaw Handle from Jaw Handle Key and Pinion Shaft (procedure 6.0, seq 700).			
740	Remove Jaw Handle Key from Pinion Shaft groove.			• Jaw Handle Key, X7000 (641) • X8000 Pinion Shaft (298)
750	Unsnap Front Panel from Chassis as shown.			• X8000 Front Panel (337) • X8000 Chassis (343)
760	Unplug Control Board/ Display Board Cable -565 from Display Board connector J20.			• Control Board/Display Board Cable Assembly (5-Pin 5-Wire) (565) • X8000 Display Board (336)

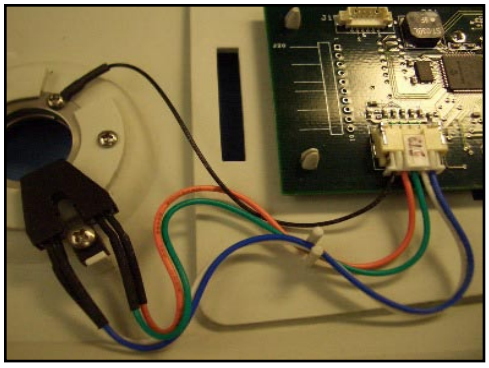
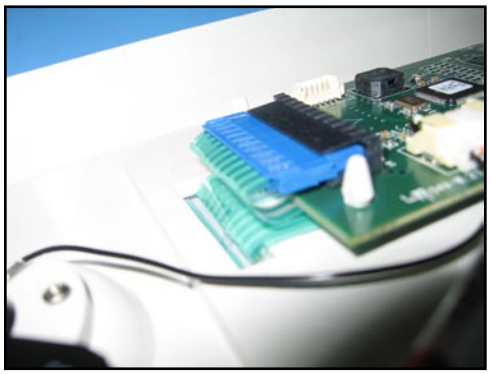
770	Unplug 3mm LED connector from Display Board connector as shown.		• X8000 3mm LED (594) • Display Board (336)
780	Pull 3mm LED from rear of Power Button.		• X8000 3mm LED (594) • Power Button (226)
790	Get new 3mm LED. Insert 3mm LED into rear of Power Button and push forward until it stops.		• X8000 3mm LED (594) • Power Button (226)
800	Plug 3mm LED connector into Display Board connector as shown. ⚠ Dress LED wires neatly against Front Panel. ⚠ Connect LED connector with metal pins facing up.		• X8000 3mm LED (594) • Display Board (336)

810	Plug Control Board/Display Board Cable -565 into Display Board connector J20 and pass through front of Chassis as shown. ⚠ Dress LED Cable under Display Board!		• Control Board/Display Board Cable Assembly (5-Pin 5-Wire) (565) • X8000 Display Board (336)
820	Snap Front Panel to Chassis as shown.		• X8000 Front Panel (337) • X8000 Chassis (343)
830	Insert Jaw Handle Key into Pinion Shaft groove.		• Jaw Handle Key, X7000 (641) • X8000 Pinion Shaft (298)
840	Attach Jaw Handle onto Jaw Handle Key and Pinion Shaft (procedure 6.0, seq 710).		
850	Slide Chassis Cover onto Chassis until flush with Chassis and secure.		• X8000 Cover (407) • X8000 Chassis (343)

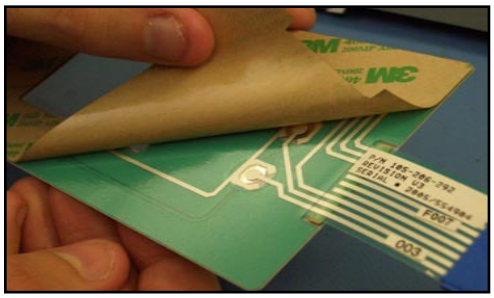
860	Screw Chassis Cover to Chassis. ⚠ Torque setting of 5.		• Power Screwdriver (Phillips)	• 6-32 x 0.25 PH Ext. Sems. (2) (198) • X8000 Cover (407) • X8000 Chassis (343)

8.0 Display Board

Seq.	Task Description	Figure	Tools Needed	Parts
870	Remove Chassis Cover from Chassis (procedure 1.0).			
880	Disconnect front panel from unit (procedure 7.0, seq 730 - 770).			
890	Unplug Front Panel Overlay Cable from Display Board connector J20.			• Front Panel Overlay Cable • Display Board (336)
900	Unplug Beam Sensor-ESST/ Display Board Cable from Display Board connector J17 as shown.			• Beam Sensor-ESST/Display Board Cable (573) • Display Board (336)
910	Unsnap Display Board from Front Panel as shown. Remove Display Board from unit.			• Display Board (336) • Front Panel Assembly
920	Peel off LCD Cover and snap on new Display Board to Front Panel with LCD facing out of Front Panel as shown.			• Display Board (336) • Front Panel Assembly

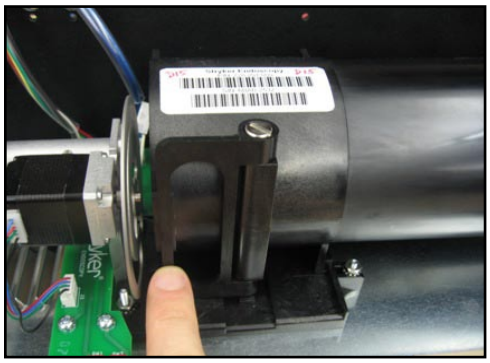
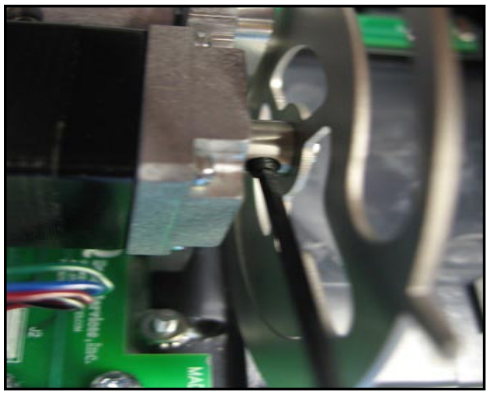
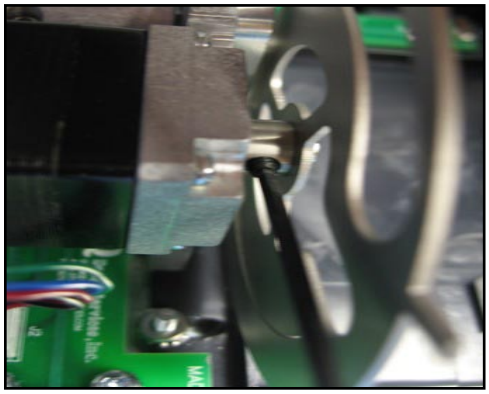
930	Plug Beam Sensor-ESST/ Display Board Cable into Display Board connector J17 as shown.		• Beam Sensor-ESST/Display Board Cable (573) • Display Board (336)
940	Plug Front Panel Overlay Cable into Display Board connector J20. ⚠ Tuck ribbon under Display Board to protect from abrasion from Jaw Assembly.		• Front Panel Overlay Cable • Display Board (336)
950	Complete the reassemble of the unit (procedure 7.0, seq 800-860).		

9.0 Front Panel Membrane

Seq.	Task Description	Figure	Tools Needed	Parts
960	Remove Chassis Cover from Chassis (procedure 1.0).			
970	Disconnect Front Panel from unit (procedure 7.0, seq 730 - 770).			
980	Remove Display Board from front panel (procedure 8.0, seq 890 - 910).			
990	Unpeel the Front Panel Membrane from Front Panel.			• Front Panel Membrane (292) • X8000 Front Panel (337)
1000	Pull Front Panel Membrane cable through Front Panel as shown.			• Front Panel Membrane (292) • X8000 Front Panel (337)
1010	Get new Front Panel Membrane. Peel adhesive backing off Front Panel Membrane. ⚠ Ensure 2nd Backing Piece behind flex cable is removed			• Front Panel Membrane (292)
1020	Pass Front Panel Membrane cable through Front Panel as shown. ⚠ Leave film on outside of display to protect it from scratching.			• Front Panel Membrane (292) • X8000 Front Panel (337)

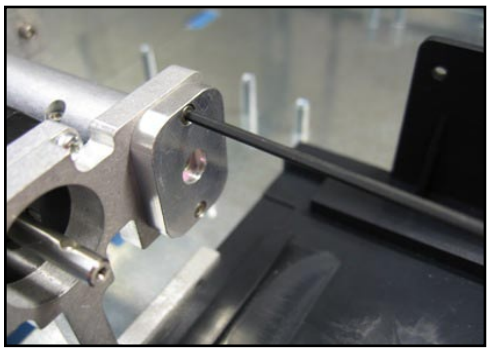
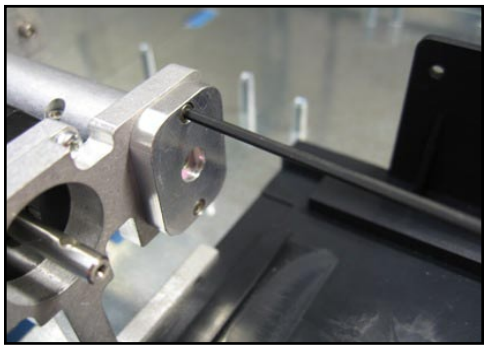
1030	Press Front Panel Membrane flush against Front Panel until adhesive backing is secure. ⚠ Check alignment before securing. Once it is on the front panel it cannot be adjusted.		• Front Panel Membrane (292) • X8000 Front Panel (337)
1040	Reinstall Display Board and cables (procedure 8.0, seq 920 - 940).		
1050	Complete the assemble of the unit (procedure 7.0, seq 800 – 860).		

10.0 Shutter

Seq.	Task Description	Figure	Tools Needed	Parts
1060	Remove Chassis Cover from Chassis (procedure 1.0). Remove Bulb Assembly.			• X8000 Bulb Assembly (331)
1070	Unscrew set screw from Shutter and motor shaft.		• 1/16” Hex Wrench	• 6-32 x 1/8 Socket HD Set Screw (001) • X8000 Shutter (577) • X8000 Stepper Motor (341)
1080	Slide Shutter off shaft with cutout passing over the rail plate protrusion.			
1090	Place new Shutter onto Stepper Motor and screw into burr hole on Motor shaft until secure. ⚠ Start screw in Shutter before mounting to Motor. ⚠ Slide Shutter on shaft with cutout passing over the rail plate protrusion.		• 1/16” Hex Wrench • Loctite 290	• 6-32 x 1/8 Socket HD Set Screw (001) • X8000 Shutter (577) • X8000 Stepper Motor (341)
1100	Slide Chassis Cover onto Chassis until flush with Chassis and secure.			• X8000 Cover (407) • X8000 Chassis (343)

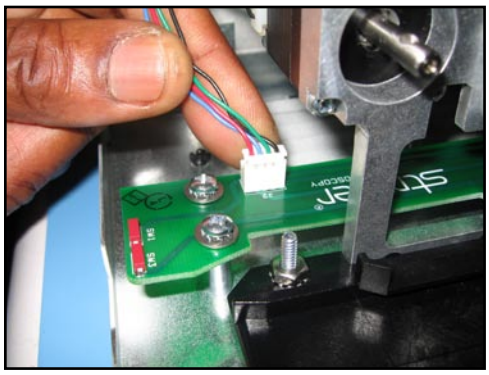
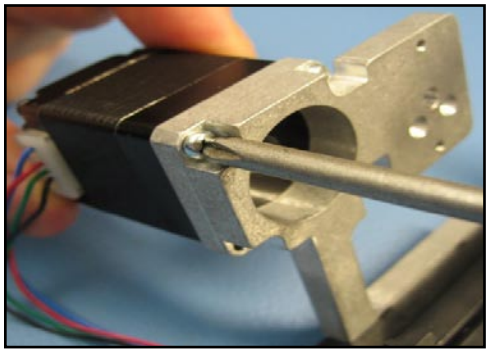
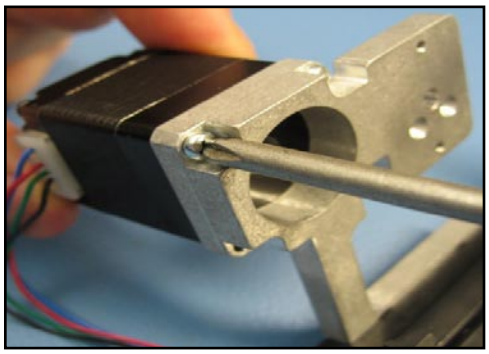
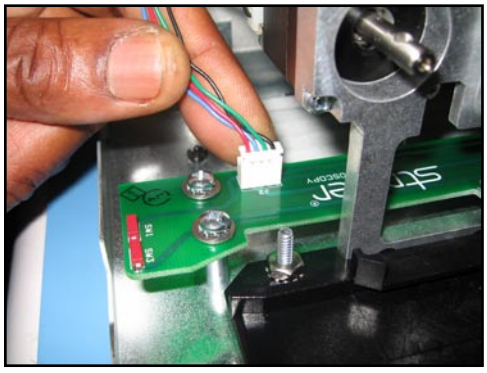
1110	Screw Chassis Cover to Chassis. Insert Bulb back in unit. ⚠ Torque setting of 5.		• Power Screwdriver (Phillips)	• 6-32 x 0.25 PH Ext. Sems. (2) (198) • X8000 Cover (407) • X8000 Chassis (343)

11.0 Hot Mirror

Seq.	Task Description	Figure	Tools Needed	Parts
1120	Remove Chassis Cover from Chassis (procedure 1.0). Remove the Bulb Assembly.			
1130	Remove Shutter (procedure 10.0, seq 1070 - 1080).			
1140	Unscrew Hot Mirror Holder from Motor Mount as shown. ⚠ Unscrew bottom screw first and then top screw.		• 5/64" Hex Wrench	• 2-56 x 0.250 Socket HD Screw (2) (344) • Hot Mirror Holder (632) • X8000 Motor Mount (339)
1150	Remove Hot Mirror from Hot Mirror Holder.			• X8000 Hot Mirror (576) • Hot Mirror Holder (632)
1160	Place new Hot Mirror in Hot Mirror Holder. ⚠ Handle Hot Mirror with Adept Wipes.			• X8000 Hot Mirror (576) • Hot Mirror Holder (632)
1170	Screw Hot Mirror Holder to Motor Mount as shown. ⚠ Screw in top screw first and then bottom screw.		• 5/64" Hex Wrench	• 2-56 x 0.250 Socket HD Screw (2) (344) • Hot Mirror Holder (632) • X8000 Motor Mount (339)

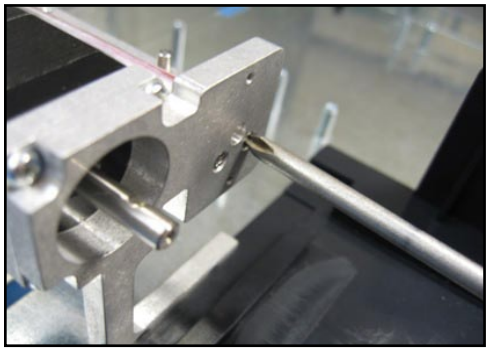
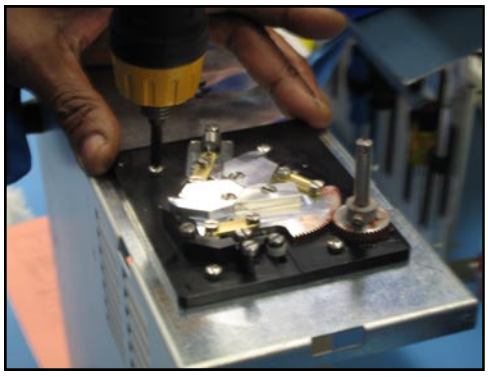
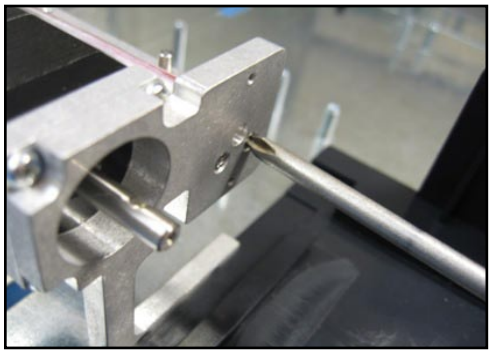
1180	Reinstall the Shutter (procedure 10.0, seq 1080 – 1090).			
1190	Slide Chassis Cover onto Chassis until flush with Chassis and secure.			• X8000 Cover (407) • X8000 Chassis (343)
1200	Screw Chassis Cover to Chassis. Insert Bulb back in unit. ⚠ Torque setting of 5.		• Power Screwdriver (Phillips)	• 6-32 x 0.25 PH Ext. Sems. (2) (198) • X8000 Cover (407) • X8000 Chassis (343)

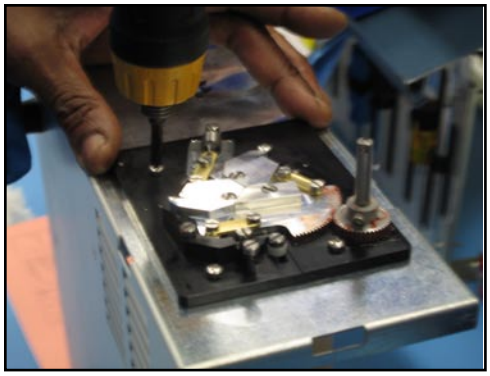
12.0 Motor

Seq.	Task Description	Figure	Tools Needed	Parts
1210	Remove Chassis Cover from Chassis (procedure 1.0). Remove the Bulb Assembly.			
1220	Remove Shutter (procedure 10.0, seq 1070 - 1080).			
1230	Unplug Stepper Motor connector from Bulb Mount Board connector J2 as shown.			• X8000 Stepper Motor (341) • X8000 Horizontal Bulb Mount Board Assembly (279)
1240	Unscrew Stepper Motor from Motor Mount.		• Power Screwdriver (Phillips)	• M2.5 x 8 mm PH Head Screw (4) (071) • X8000 Stepper Motor (341) • X8000 Motor Mount (339)
1250	Get new Stepper Motor. Screw in new Stepper Motor to Motor Mount. ⚠ Make sure the Motor wire pointed towards outside of Chassis.		• Power Screwdriver (Phillips)	• M2.5 x 8 mm PH Head Screw (4) (071) • X8000 Stepper Motor (341) • X8000 Motor Mount (339)
1260	Plug Stepper Motor connector into Bulb Mount Board connector J2 as shown.			• X8000 Stepper Motor (341) • X8000 Horizontal Bulb Mount Board Assembly (279)

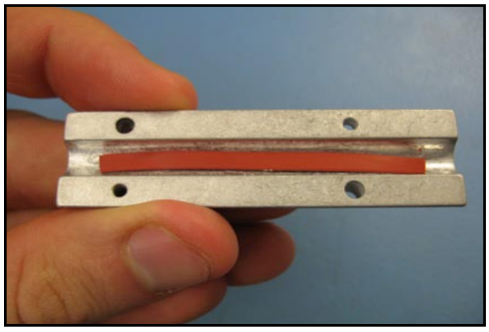
1270	Reinstall the Shutter (procedure 10.0, seq 1080 – 1090).			
1280	Slide Chassis Cover onto Chassis until flush with Chassis and secure.			• X8000 Cover (407) • X8000 Chassis (343)
1290	Screw Chassis Cover to Chassis. Insert Bulb back in unit. ⚠ Torque setting of 5.		• Power Screwdriver (Phillips)	• 6-32 x 0.25 PH Ext. Sems. (2) (198) • X8000 Cover (407) • X8000 Chassis (343)

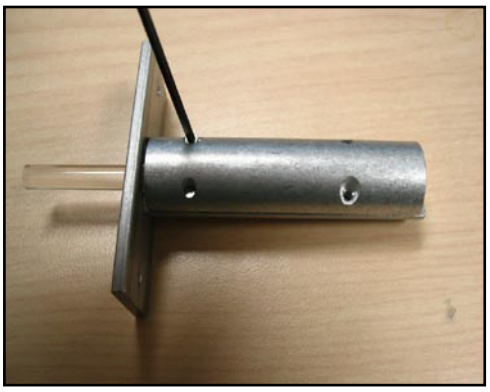
13.0 Jaw Assembly

Seq.	Task Description	Figure	Tools Needed	Parts Needed
1300	Remove Chassis Cover from Chassis (procedure 1.0). Remove the Bulb Assembly.			
1310	Remove Shutter (procedure 10.0, seq 1070-1080).			
1320	Remove Hot Mirror Holder (procedure 11.0, seq 1140). ! Make sure the Hot Mirror remains in the Hot Mirror Holder.			
1330	Disconnect Front Panel from unit (procedure 7.0, seq 730 - 770).			
1340	Unscrew Lower Integrating Rod Holder from Motor Mount.		• Screwdriver (Phillips)	• 2-56 x ¼ FH PH Screw (2) (645) • X8000 Motor Mount (339) • Lower Integrating Rod Holder (276)
1350	Unscrew Jaw Assembly from front of Chassis. Remove Jaw Assembly.		• Power Screwdriver (Phillips)	• 6-32 x 3/8 PH Screw (4) (441) • Completed X8000 Jaw Assembly • X8000 Chassis (343)
1360	Get new Jaw Assembly. Screw Lower Integrating Rod Holder to Motor Mount until secure.		• Screwdriver (Phillips)	• 2-56 x ¼ FH PH Screw (2) (645) • X8000 Motor Mount (339) • Lower Integrating Rod Holder (276)

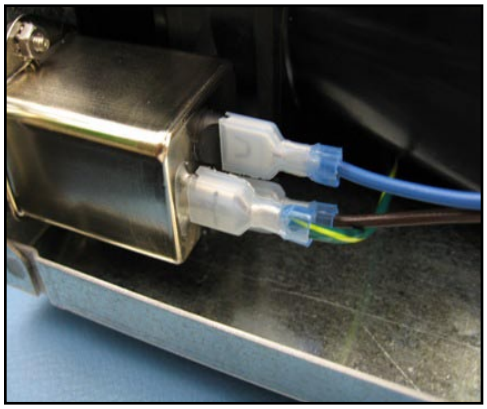
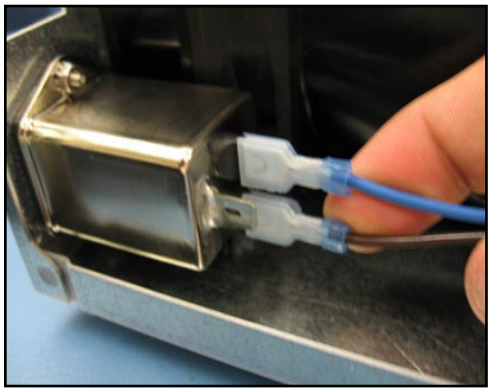
1370	Screw Jaw Assembly to front of Chassis until secure. ⚠ Torque setting of 5! ⚠ Apply enough Loctite 290 so that it is visible on Chassis threads.		• Q-Tips • Loctite 290 • Power Screwdriver (Phillips)	• 6-32 x 3/8 PH Screw (4) (441) • Completed X8000 Jaw Assembly • X8000 Chassis (343)
1380	Reinstall Hot Mirror Holder (procedure 11.0, seq 1170).			
1390	Reinstall the Shutter (procedure 10.0, seq 1080 – 1090).			
1400	Complete the assembly of the unit (procedure 7.0, 810 – 860).			

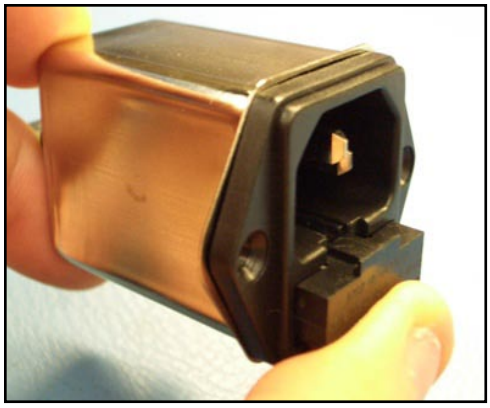
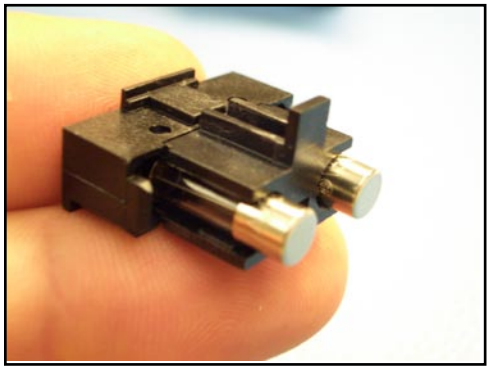
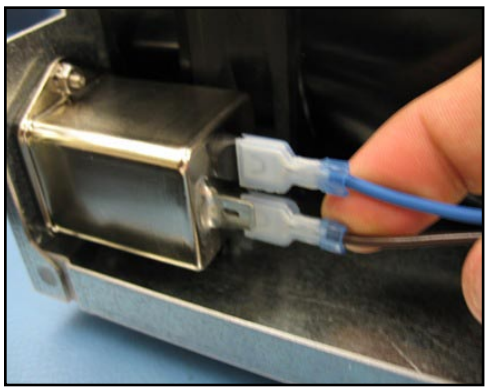
14.0 Integrating Rod

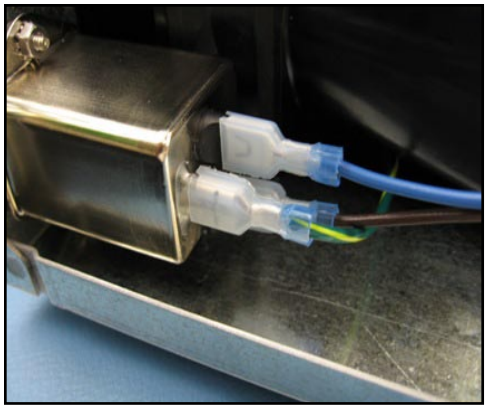
Seq.	Task Description	Figure	Tools Needed	Parts
1410	Remove Chassis Cover from Chassis (procedure 1.0)			
1420	Remove Shutter, Hot Mirror Holder, Front Panel and Jaw Assembly (procedure 13.0, seq 1310 – 1350).			
1430	Unscrew Upper Integrating Rod Holder from Lower Integrating Rod Holder and remove rod.		• 5/64" Hex Wrench	• 2-56 x 0.250 Socket HD Screw (2) (344) • Upper Integrating Rod Holder (277)
1440	Slide new Integrating Rod into Lower Integrating Rod Holder and push forward until flush with end of Holder. ⚠ Do Not Touch Ends. ⚠ Make sure new Rod has no chips.			• X8000 Integrating Rod (314) • Lower Integrating Rod Holder (276)
1450	Salvage silicone strip from original assembly unless adhesive on strip is longer affective. Replace if necessary. Press Silicone Strip into Upper Integrating Holder.			• Silicone Strip 2in x 1/8 in (595) • Upper Integrating Rod Holder (277)

1460	Screw Upper Integrating Rod Holder to Lower Integrating Rod Holder. ⚠ Ensure Integrating Rod is flush with end of Lower Integrating Rod Holder.		• 5/64” Hex Wrench	• 2-56 x 0.250 Socket HD Screw (2) (344) • Upper Integrating Rod Holder (277)
1470	Complete assembly of the unit (procedure 13.0, seq 1360 – 1400).			

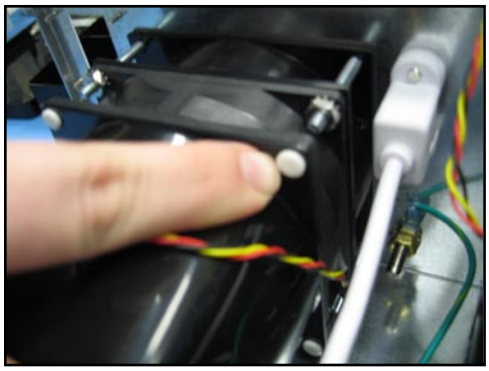
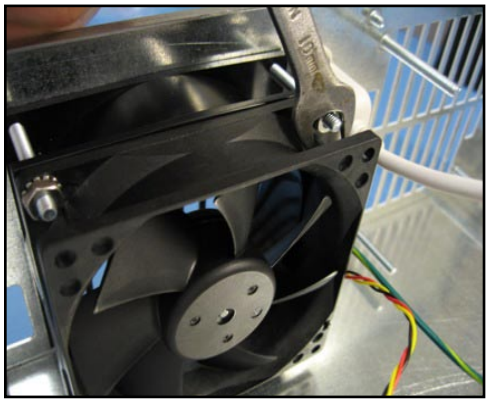
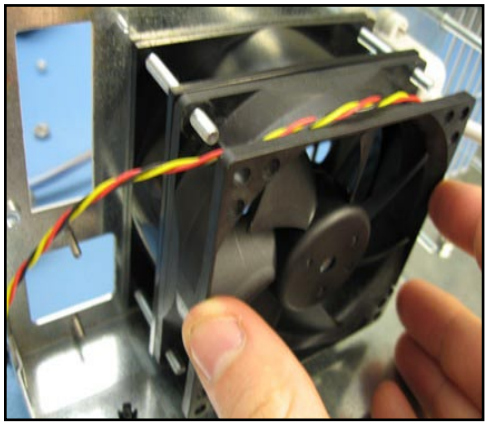
15.0 AC Inlet Filter

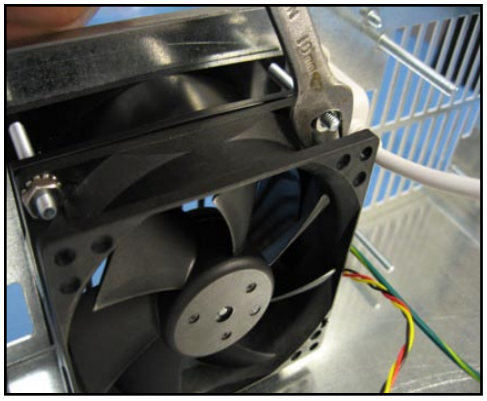
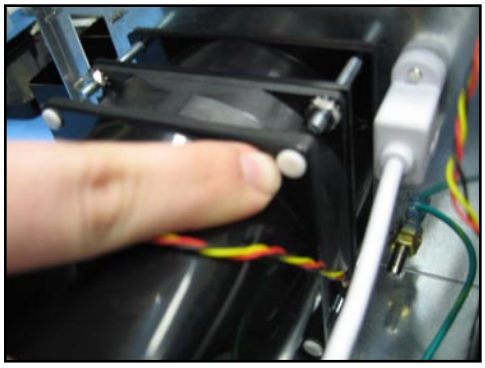
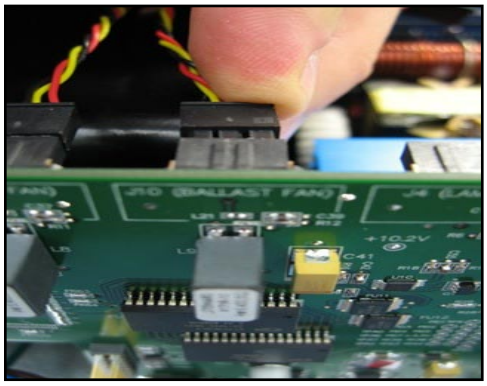
Seq.	Task Description	Figure	Tools Needed	Parts
1480	Remove Chassis Cover from Chassis (procedure 1.0).			
1490	Remove Control Board (procedure 2.0, seq 50 – 80).			
1500	Remove Ballast (procedure 3.0, seq 230 – 280).			
1510	Remove Ground Post Cable from outermost single flange of A/C Inlet Filter.			• X8000 Ground Post Cable (591) • A/C Inlet Filter (575)
1520	Remove A/C Filter/AC Inlet Board Cables from A/C Inlet Filter.			• A/C Filter/AC Inlet Board Cable (570) • A/C Inlet Filter (575)
1530	Unscrew A/C Inlet Filter from Chassis.		• A/C Inlet Filter Tightening Tool • ¼" Nut Driver	• 4-40 SS B KEP Nuts (2) (484) • A/C Inlet Filter (575) • X8000 Chassis (343)

1540	Remove fuse holder from A/C Inlet Filter.		• Tweezers	• 5A SLO-BLO Fuse (2) (435) • A/C Inlet Filter (575)
1550	Take out original 5A SLO-BLO fuses from A/C Inlet Filter fuse holder. Put fuses in fuse holder a new AC Inlet Filter. ⚠ Open holder using a Screwdriver (Flathead).		• Screwdriver (Flathead)	• 5A SLO-BLO Fuse (2) (435) • A/C Inlet Filter (575)
1560	Screw new A/C Inlet Filter to Chassis with single prong facing out of Chassis as shown. ⚠ Attach lower nut first!		• A/C Inlet Filter Tightening Tool • ¼" Nut Driver	• 4-40 SS B KEP Nuts (2) (484) • A/C Inlet Filter (575) • X8000 Chassis (343)
1570	Attach A/C Filter/AC Inlet Board Cable to A/C Inlet Filter with Blue Wire on top flange and Brown Wire on bottom flange. ⚠ Flat side of Cable should face out of Chassis.			• A/C Filter/AC Inlet Board Cable (570) • A/C Inlet Filter (575)

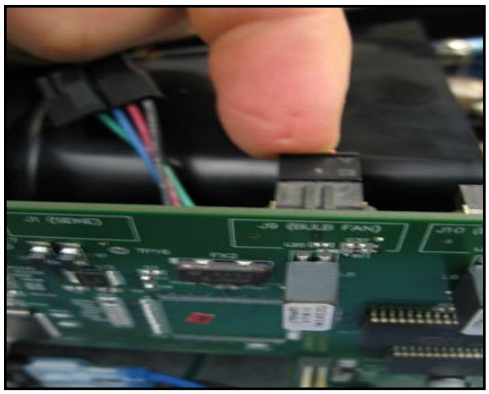
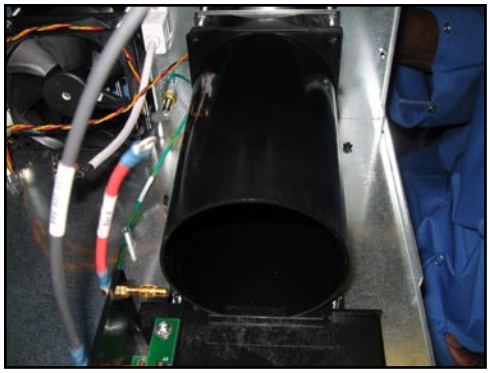
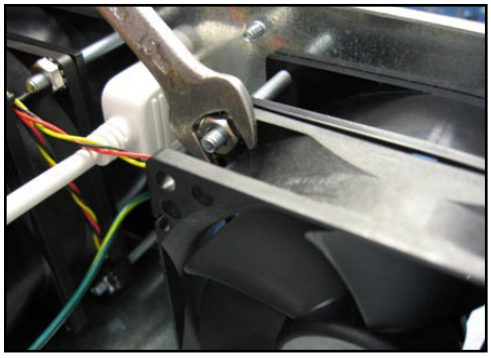
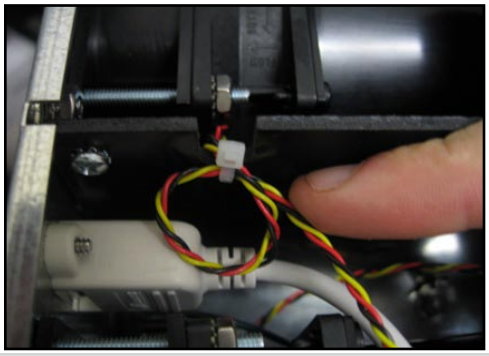
1580	Attach Ground Post Cable to outermost single flange of A/C Inlet Filter by running Cable under Ballast Duct. ⚠ Flat side of Green Cable should face out of Chassis		• X8000 Ground Post Cable (591) • A/C Inlet Filter (575)
1590	Reinstall Ballast (procedure 3.0, seq 380 – 450).		
1600	Reinstall Control Board and Chassis Cover (procedure 2.0, seq 100 – 190).		

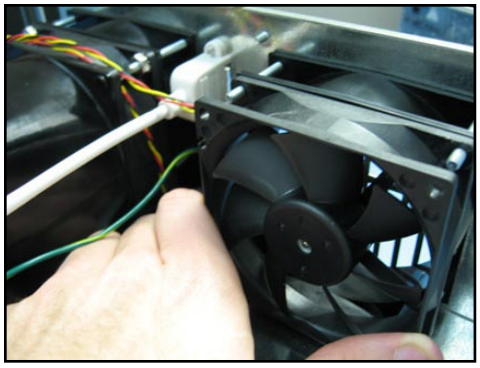
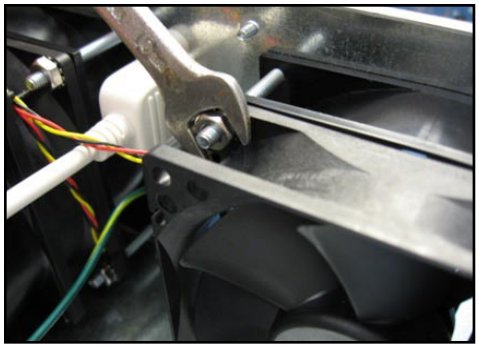
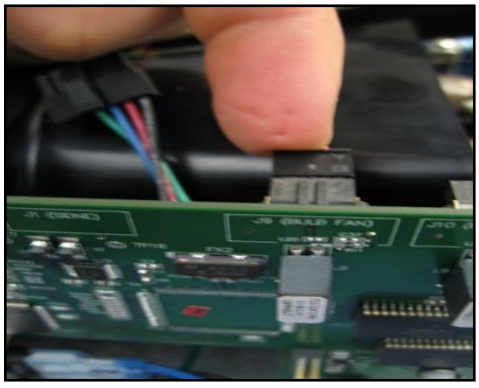
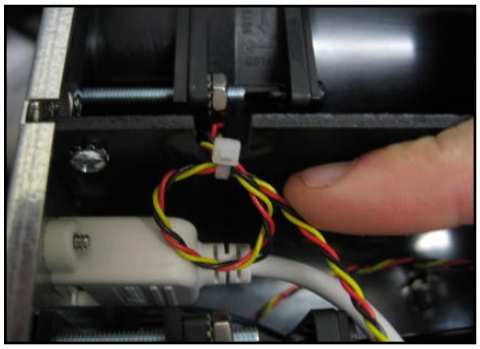
16.0 Ballast Fan

Seq.	Task Description	Figure	Tools Needed	Parts
1610	Remove Chassis Cover, Control Board, Ballast, and AC Inlet Filter (procedure 15.0, seq 1480 - 1530).			
1620	Use a screwdriver to pop ballast duct rivets free and remove duct.		• Flathead screwdriver	• Nylon Snap Rivets (4) (816) • Ballast Duct (326) • 3-Wire Fan (507)
1630	Unscrew nuts from Ballast side PEM's. Remove connector from control board and remove fan.		• 11/32" Wrench	• #8-32 KEP Nuts (3) (491) • 3-Wire Fan (507) • Fan Duct (498) • X8000 Chassis (343)
1640	Place new 3-Wire Fan onto Ballast side onto Chassis PEM's with sticker facing out of Chassis and plug connector into control board. ⚠ Looking from the rear of the chassis, wire should be located at 7:00.			• 3-Wire Fan (507) • Fan Duct (498) • X8000 Chassis (343)

1650	Screw nuts to 3-Wire Fan for Ballast side to PEM's until secure against Fan Duct as shown. ⚠ Do not bend fan flange by over-tightening. ⚠ Leave lower inside nut off. ⚠ Use Loctite 290 on standoffs.		• Loctite 290 • 11/32" Wrench	• #8-32 KEP Nuts (3) (491) • 3-Wire Fan (507) • Fan Duct (498) • X8000 Chassis (343)
1660	Secure Ballast Duct to 3-Wire Fan on Ballast side using Nylon Snap Rivets. ⚠Turn Chassis on side to set rivets in place. ⚠It may help to use Needlenose Pliers for hard to reach spaces!		• Needlenose pliers	• Nylon Snap Rivets (4) (816) • Ballast Duct (326) • 3-Wire Fan (507)
1670	Connect 3-Wire Fan from Ballast Fan to Control Board connector J10 (BALLAST FAN). ⚠ Do not bend Control Board!			• 3-Wire Fan Cable from Ballast Fan (3-Pin 3-Wire) • X8000 Control Board (873)
1680	Complete assembly of the unit (procedure 15.0, seq 1560 - 1600).			

17.0 Bulb Fan

Seq.	Task Description	Figure	Tools Needed	Parts
1690	Remove Chassis Cover from Chassis (procedure 1.0). Remove the Bulb Assembly.			
1700	Disconnect 3-Wire Fan cable from Control Board connector J9 (BULB FAN).			• 3-Wire Fan Cable from Bulb Fan (3-Pin 3-Wire) • X8000 Control Board (873)
1710	Use a screwdriver to pop rivets on the bulb duct free and remove duct.		• Flathead Screwdriver.	• Nylon Snap Rivets (4) (816) • Bulb Duct (325) • 3-Wire Fan (507)
1720	Remove nuts from PEMs and remove fan.		• 11/32" Wrench	• #8-32 KEP Nuts (3) (491) • 3-Wire Fan (507) • Fan Duct (498) • X8000 Chassis (343)
1730	Remove wire tie securing 3-Wire Fan cable from Bulb Fan to Separator as shown. Remove Fan and get new Fan.		• Cable Tie Cutters	• Standard Cable Tie (873) • Separator (328) • Bulb Fan Cable (507)

1740	Place new 3-Wire Fan for Bulb side onto Chassis PEM's with sticker facing out Chassis . ⚠ Looking from the rear of the chassis, wire should be located at 2:00.			• 3-Wire Fan (507) • Fan Duct (498) • X8000 Chassis (343)
1750	Screw nuts to 3-Wire Fan for Bulb side to PEM's until secure against Fan Duct as shown. ⚠ Do not bend fan flanges by over-tightening. ⚠ Leave lower inside nut off. ⚠ Use Loctite 290 on standoffs.		• Loctite 290 • 11/32" Wrench	• #8-32 KEP Nuts (3) (491) • 3-Wire Fan (507) • Fan Duct (498) • X8000 Chassis (343)
1760	Connect 3-Wire Fan cable from Bulb Fan to Control Board connector J9 (BULB FAN) ⚠ Do not bend Control Board!			• 3-Wire Fan Cable from Bulb Fan (3-Pin 3-Wire) • X8000 Control Board (873)
1770	Secure 3-Wire Fan cable from Bulb Fan to Separator as shown. ⚠ Secure using a loop of excess wire in Cable Tie!		• Cable Tie • Cutters	• Standard Cable Tie (873) • Separator (328) • Bulb Fan Cable (507)

1780	Slide Chassis Cover onto Chassis until flush with Chassis and secure.			• X8000 Cover (407) • X8000 Chassis (343)
1790	Screw Chassis Cover to Chassis. Insert Bulb back in unit. ⚠ Torque setting of 5.		• Power Screwdriver (Phillips)	• 6-32 x 0.25 PH Ext. Sems. (2) (198) • X8000 Cover (407) • X8000 Chassis (343)

Final Testing and Inspection

Tools Needed

- Torque Wrench
- Fiber Optic Light Cable
- Arthroscopes
- Sidne Voice Activation System
- 6 ft. Serial USB Cable
- BioTek Safety Analyzer
- 240 V Transformer
- 120V Transformer
- X8000 Fan Direction Fixture

Cosmetic Inspection

1. Replace the front panel, chassis, and chassis cover to fit snugly with no visible gaps.
2. Check that the logos and printing on the back panel are clear.
3. Check that the logos and printing on the front panel are clear.
4. All connectors should be properly oriented with no visible gaps.
5. All surfaces should be smooth and free of scratches or dents.

Bulb Inspection

1. The bulb should be clean with no fingerprints, cracks, or thermal paste compound on the glass surface.
2. Verify that the serial number is above the handle on the bulb.
3. Tighten the female connectors with the torque wrench set to 18 in-lbs.
4. The bulb module should slide and lock into place on the rail plate.

Power on Test

1. Connect the X8000 to the 120 V power supply.
2. Press the power button on and verify that the bulb does illuminate.
3. Insert the optical fiber light cable in the jaw. The bulb should ignite and stay lit.

Front Panel Functional Test

1. While the light source is turned on, the standby LED should be lit and the display should read “Standby”. There should be a brightness display on the top right hand corner of the LED display

2. Press the up/down brightness membrane button to increase/decrease the brightness number in the upper right hand corner. The light source should not come off standby.

3. Press the run/standby membrane button. The light source should go into run mode and the run LED should be lit. The brightness percentage should be the same as the number previously in the top right hand corner.

Brightness step-up/down

1. Press the brightness membrane button multiple times to go once all the way from either 0 to 100% or 100% to 0%. The brightness display should increase or decrease without skipping.

Door Switch Test

1. Open the bulb side door and verify that the bulb turns off, the light source goes into standby, the standby LED is lit, and the LED display reads standby with the current brightness setting in the upper right hand corner.

2. Close the bulb side door and verify that the bulb turns on but the light source stays in standby with the same displays on the LED.

Fan Test

1. Verify that the fans are blowing out of the unit by using the fan flow direction fixture.

Jaw Test

1. Remove the light cable by turning the knob clockwise on the jaw assembly. The jaw should lock open. Verify that the bulb turns off, the lgihtsource goes into standby, and the standby LED is lit when the light cable is removed.

Hi-Pot/Di-Electric Breakdown Test

1. Energize the Hi-Pot tester and adjust the test voltage to 1.8 kV.
2. Plug the test fixture into the back of the unit.
3. Connect the alligator clip to the ground post of the unit...
4. Touch the positive (red) probe to the Hi-Pot test fixture and press test on the Hi-Pot tester for 1 second.

Note — Always check the hi-pot tester for proper functionality prior to use by hitting the test butoon and touching the leads. The hi-pot tester should emit the “fail” alarm.

Caution — **Do not test the unit for more than 1 second or internal damage can occur.**

Warranty

This Stryker Endoscopy product is warranted to the original purchaser to be free from defects in material and workmanship for the following times:

One year following shipment.

This warranty extends to all purchases and is limited to the repair or replacement of the product without charge when returned in the original shipping case to:

Stryker Endoscopy
5900 Optical Court
San Jose, CA 95138

Stryker Endoscopy cannot accept responsibility for returns or replacements which have not been authorized. This warranty does not cover damages caused by misuse or by failure to follow the procedures outlined in this manual or demonstrated by Stryker Endoscopy representatives.

There are no other expressed warranties.

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